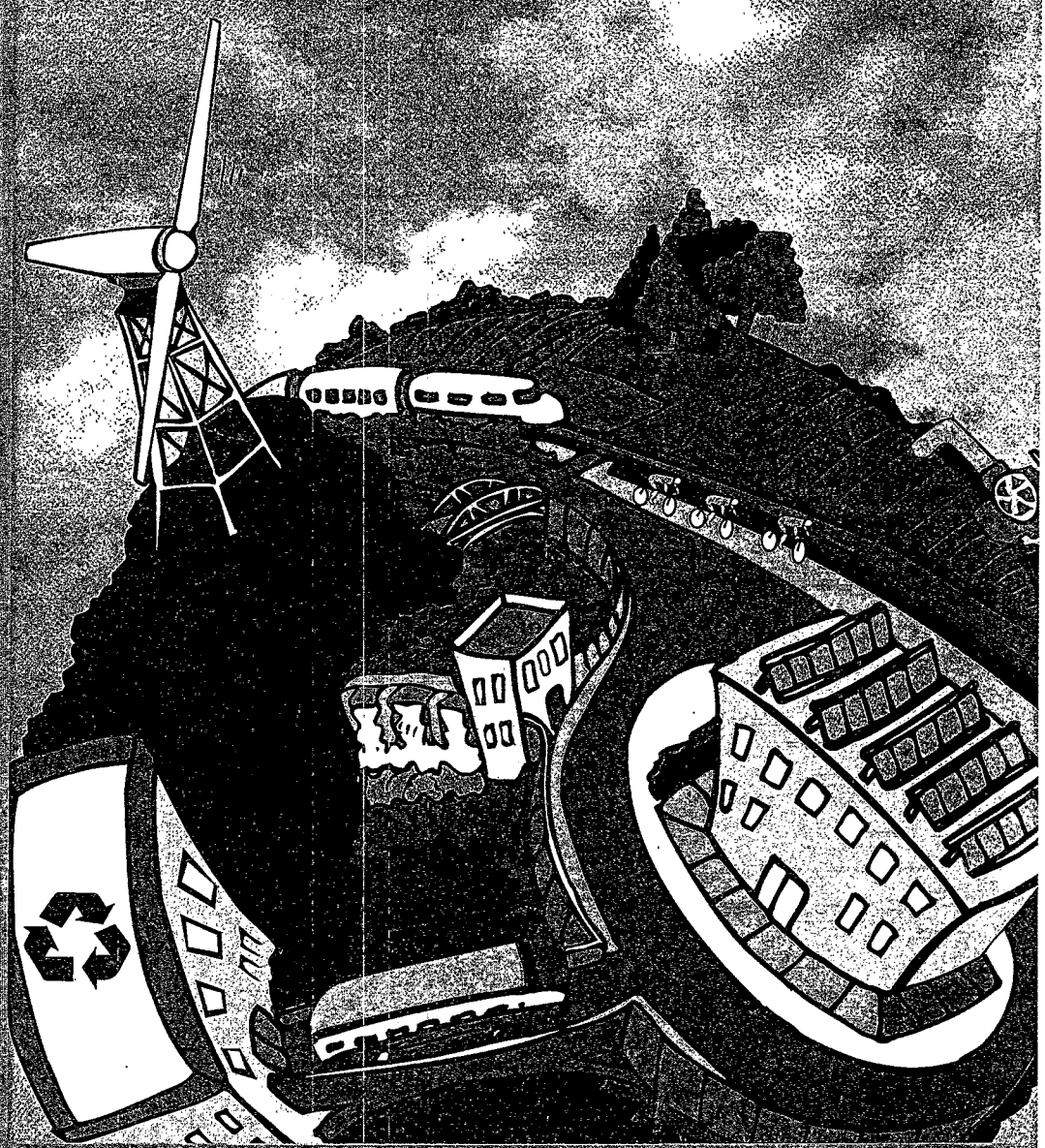
United States
Environmental Protection
Agency

EPA 230-F-97-001
July 1997

Office of Policy, Planning and Evaluation (2174)

EPA

Cool Facts About Global Warming

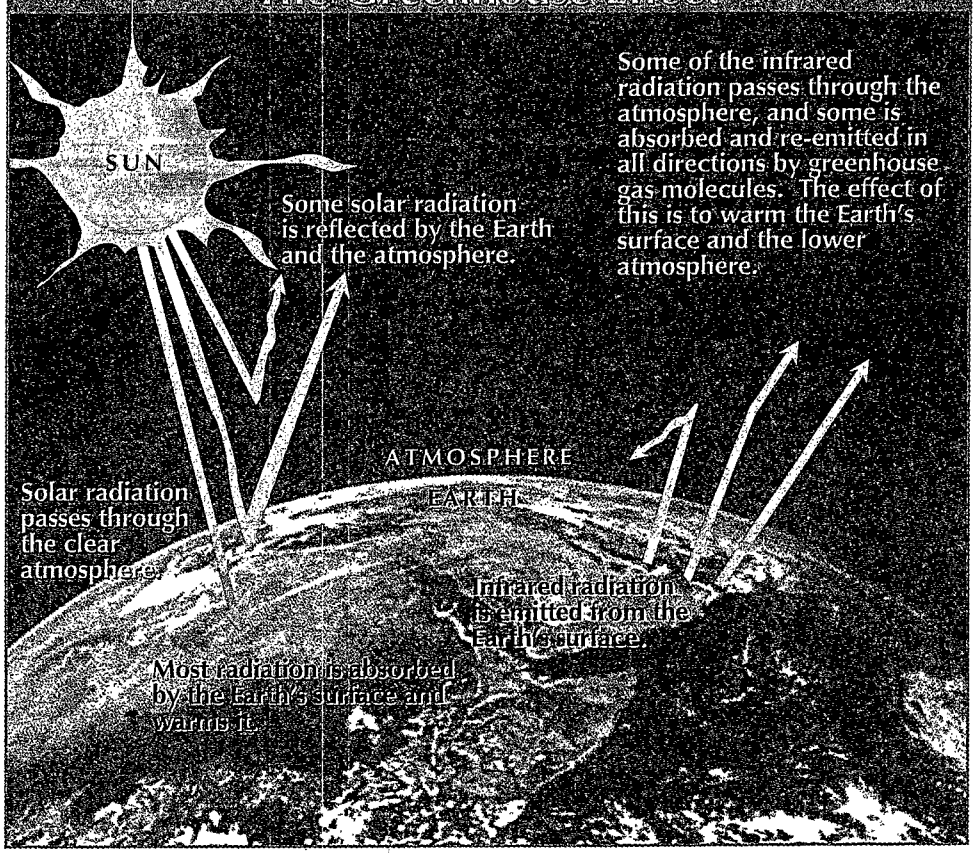


1

What Is Global Warming?

For most of human history, changes in the earth's climate resulted from natural causes that usually took place over hundreds or thousands of years. But today, human activities are beginning to affect our climate in serious and immediate ways—intensifying a natural phenomenon called the "greenhouse effect." The result is a long-term rise in the average temperature of the Earth—global warming.

The Greenhouse Effect



2

What Causes Global Warming?

We rely on fossil fuels—like coal, natural gas, oil, and gasoline—to power our cars, factories, utilities, and appliances. But burning more and more of these fuels is releasing large quantities of gases such as carbon dioxide and nitrous oxide into the atmosphere. Decaying garbage in our landfills releases methane, another potent gas.

All of these gases prevent the sun's energy from escaping back into space. Trapping heat close to the surface of the earth raises global temperatures, turning our world into a sort of planetary greenhouse.

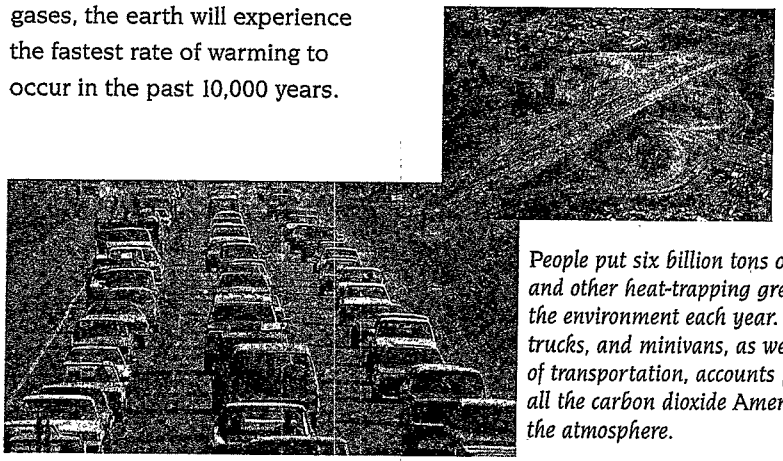
Since the beginning of the Industrial Revolution, concentrations of these "greenhouse gases" have increased substantially. Unless we take steps to combat global warming, greenhouse gases will continue to build up in our atmosphere, with long-term consequences for the health and well-being of people, plants, and animals.

If emissions of greenhouse gases continue to grow, carbon dioxide concentrations will approach twice their pre-industrial level by the end of the 21st century.

The Intergovernmental Panel on Climate Change, established in 1988 by the United Nations and the World Meteorological Organization, concluded that, due to the surge in greenhouse gases, the earth will experience the fastest rate of warming to occur in the past 10,000 years.

Note:

Some gases such as chlorofluorocarbons cause the ozone layer that shields the earth from the harmful rays of the sun to become thinner. Over the Antarctic, the damage to the ozone layer has been so great that a so-called "hole" appears each year. Although this disintegration of the ozone layer is a serious environmental problem, it is quite different from global warming. For more information about the thinning of the ozone layer, contact the U.S. Environmental Protection Agency's Ozone Hotline (1-800-296-1996).



People put six billion tons of carbon dioxide and other heat-trapping greenhouse gases into the environment each year. Driving cars, trucks, and minivans, as well as other forms of transportation, accounts for 32 percent of all the carbon dioxide Americans pump into the atmosphere.

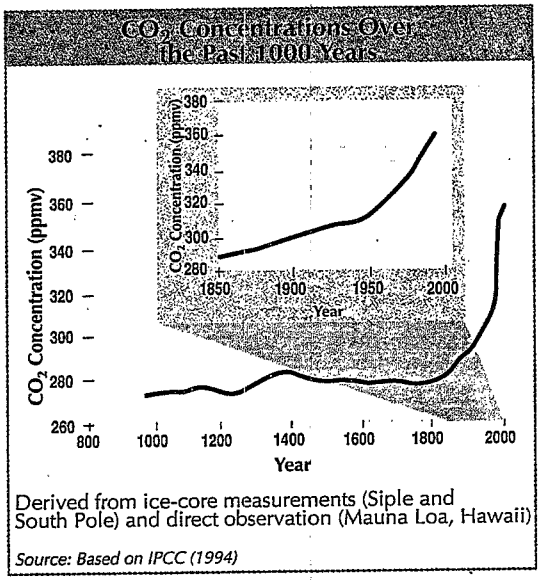
3

How Do We Know It's Happening?

The thermometer tells the tale. The 10 warmest years this century have occurred since 1980. Worldwide, according to some researchers, 1995 was the hottest year on record.

It's not just temperatures that are rising. Studies show that during the last century a increase in precipitation worldwide also occurred. These two phenomena—along with a decrease in the amount of snow that covers the northern hemisphere, a simultaneous decrease in Arctic sea ice, continued melting of alpine glaciers, and a rise in sea level—are all consistent with global warming.

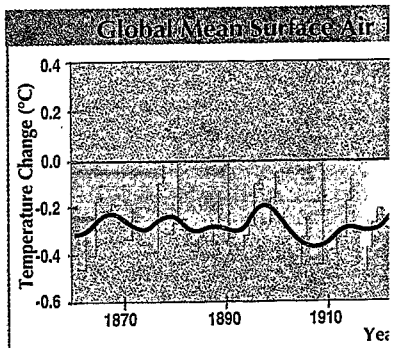
Unless we burn fewer fossil fuels and reduce the release of greenhouse gases into the atmosphere, global warming will continue—going up approximately 3.6 degrees Fahrenheit over the next 100 years. Such an increase may not seem like a lot—but in fact, this temperature rise is happening at the most rapid rate of change in recorded history. And it is precisely this rapid rate of change that people, plants, and animals may not be able to adjust to.



Derived from ice-core measurements (Siple and South Pole) and direct observation (Mauna Loa, Hawaii)

Source: Based on IPCC (1994)

Carbon dioxide emissions have increased nearly 30 percent since the beginning of Industrial Revolution, methane concentra have almost tripled, and nitrous oxide concentrations have risen by 15 percent.



Temperatures expressed relative to 1951

Source: Based on IPCC (1990)

4

Scientists Agree: We *Are* Changing Our Climate

After extensive research and observation, most scientific experts and the governments of their countries overwhelmingly agree that people are altering the earth's climate.

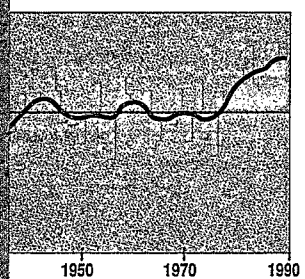
> ***"The balance of evidence suggests that there is a discernible human influence on global climate."***
>
> ***— Intergovernmental Panel on Climate Change December 1995***

- In 1990, 49 Nobel Prize winners and 700 members of the National Academy of Sciences said there is "broad agreement" among scientists that the growing greenhouse effect "has the potential to produce dramatic changes in climate."
- In 1992, the European Community and 154 separate nations, including the United States, signed an agreement pledging to reduce greenhouse gases.
- In 1995, 2,000 scientists signed a historic document, which was formally accepted by 96 nations, that noted the "balance of evidence suggests that there is a discernible human influence on global climate."
- In 1996, the World Health Organization, scientists, and United Nations officials called for stronger efforts to combat global warming.

Nations Agree To Ta

- In 1992 more than 150 countries si Framework Convention on Climate agreement, developed countries ain emissions to 1990 levels by the yea
- At the First Conference of the Partie in 1995, the Parties (signatory natio would not meet their 2000 target a new, strengthened agreement by the
- The negotiations were accelerated Parties in Geneva in 1996. At this se recent findings of the Intergovernm and called for urgent action to redu
- The Third Conference of the Parties December 1997. The Parties plan t session.

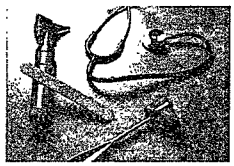
rature, 1861-1989



verage

5 Why Should We Care?

Because a warmer climate makes moisture evaporate more quickly, more damaging and costly droughts could occur in some areas and heavier rains could fall in other regions.



Deadly diseases that exist primarily in warmer climates could spread into other parts of the world, challenging the ability of public health programs to contain them.

Communities that border coastal areas would have to relocate houses or spend hundreds of millions of dollars per year on projects to hold back the sea.

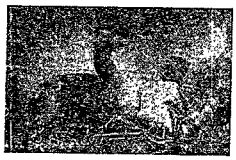
(e Action)

ed the United Nations
ange (UNFCCC). Under the
o reduce their greenhouse gas
000.

to the UNFCCC held in Berlin
) noted that most countries
called for negotiation of a
nd of 1997.

the Second Conference of the
ion, the Parties endorsed the
tal Panel on Climate Change
greenhouse gas emissions.

ill be held in Kyoto, Japan, in
dopt a new agreement at this

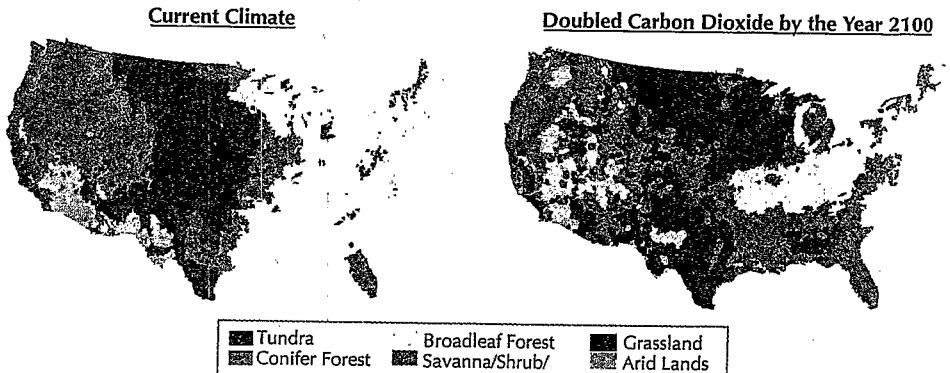


Opportunities to enjoy hunting and fishing could dwindle as habitats in certain parts of the country change before the fish and wildlife that live in them have a chance to adapt.

The direct and indirect effects of climatic change, including variations in water temperature, could affect fish populations in critical ways. For example, stocks of brook trout that are popularly fished from Maine to Montana and beyond could be depleted or even eliminated.

What may seem like a small temperature fluctuation can make a big difference. For example, during the most recent ice age, annual global temperatures averaged roughly 9 degrees Fahrenheit colder than they are today.

Projected Changes in Vegetation



UKMO Climate Change Scenario. *Source: Adapted from Neilson, 1995; VEMAP Members, 1995.*

Cool Facts About What We've Done

Though serious, these trends are not yet irreversible. Fortunately, millions of consumers, industries, and businesses already have taken hundreds of cost-effective steps to reduce the impact of global warming—by using energy more efficiently and by switching to non-fossil, renewable energy sources like water, wind, and solar power.

The U.S. Environmental Protection Agency conducts many voluntary programs to encourage energy conservation and the use of alternative energy. The EPA also assesses the risks of global warming so that national efforts to address the issue target the most important needs.

Enforcement of many EPA regulations that implement environmental laws such as the Clean Air Act contributes by indirectly reducing the use of fossil fuels and encouraging conversions to alternative energy. EPA programs that involve regulated industries in reducing the release of pollutants to the air, such as the Toxic Release Inventory and Acid Rain Program, also augment voluntary citizen actions to reduce the impact of global warming.

Energy efficiency measures not only save energy—they save money too.

- New homes and buildings incorporating innovations from the government's ENERGY STAR® programs use, on average, 30 percent less energy than more standard designs—but maintain the same quality of life. Even a typical home built 15 years ago can be upgraded to reduce energy use by 20 percent.
- Wind power already provides enough electricity for one million Americans.
- The average new vehicle today gets double the number of miles per gallon that cars got in 1973. The United States and other countries are now trying to produce automobiles that are three times more fuel efficient than today's models. In addition, a number of

Look for the ENERGY STAI

Products that bear the ENERGY STAR® label, whi stands for high efficiency, include many types of off equipment, home appliances, residential heating and cooling equipment, residential lightir fixtures, exit signs, and also new hon Products with the ENERGY STAR® lab save energy and money, perform bett and help prevent air pollution. A U.S household can reduce its energy bill up to 40 percent with the purchase o products with this label. Businesses c realize substantial savings as well.

Shining Example: The Johnson & Johns company has made a commitment to use ENERGY STAR® office equipment evaluate opportunities to save energy on existing office equipment, and educate employees in wise energy us Johnson & Johnson estimates that,

consumers and businesses are starting to rely on vehicles that run efficiently on electricity, solar power, or natural gas.

- More than 2,000 companies have cut their energy consumption substantially by using energy-efficient lighting—and realized savings of 30 percent or more of their original investment.
- Innovative projects across the country are recovering methane, the landfill-produced greenhouse gas, and using it to generate electricity and boiler steam for space heating or converting it to natural gas or fuel for vehicles.

There is money to be made and saved by relying on existing energy-efficiency technologies as well as non-fossil, renewable fuels.

Reducing the risks of global warming will be a win-win situation for us and the world we live in. Let's start *now*.

thanks to its participation in ENERGY STAR® programs, the company is saving $1.5 million a year, while eliminating the production of 32 million pounds of carbon dioxide emissions.

Cities for Climate Protection

This program, sponsored by the International Council for Local Environmental Initiatives and the U.S. Environmental Protection Agency, offers guidelines to help cities reduce greenhouse gas emissions, particularly those generated by buildings and transportation.

Shining Example: The City of Saint Paul, Minnesota, is replacing lighting, heating, and other equipment in municipal buildings with energy-efficient products. The replacements already have started saving the city $277,065 a year while reducing carbon dioxide emissions by 3,864 tons annually.

WasteWi$e

WasteWi$e encourages businesses to reduce solid waste through waste prevention, recycling, and buying or manufacturing products with recycled content. Some of the most significant waste prevention savings can be achieved through reductions in transportation packaging.

Shining Example: When Pepsi-Cola replaced corrugated shipping containers with reusable plastic cases, the company eliminated 196 million pounds of cardboard packaging in one year alone. By also converting to lightweight lids, Pepsi saved almost 11 million pounds of aluminum in a single year.

9

New—And Old—Sources of Clean E

Energy sources other than fossil fuels are as old as windmills—and as new as the latest solar technology.

Making the most of cleaner, renewable energy sources can save money and foster new industries for the 21st century. Renewable technologies also help reduce the greenhouse gases that are adversely affecting our climate.

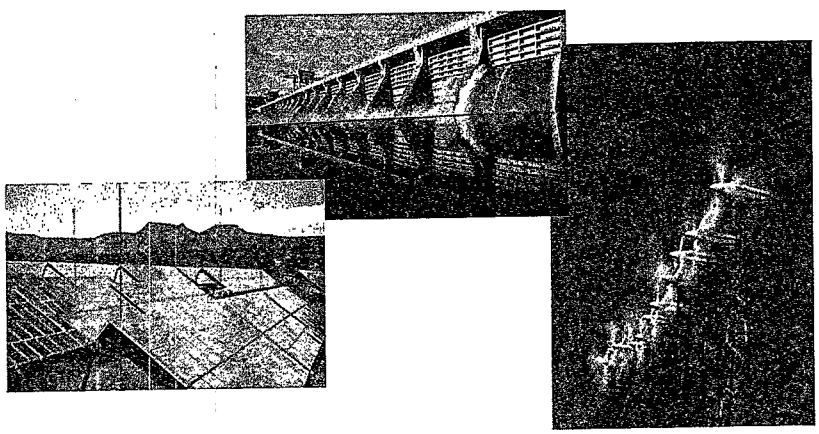
Key cleaner energy sources include:

Solar power, which harnesses energy from the sun to heat our homes and provide domestic hot water.

Geothermal power, which taps into natural reservoirs of steam and hot water in the earth itself in order to draw them to the surface for use as heat or to generate electricity for home or industrial uses.

Biomass, which employs crops and trees specifically grown as fuel sources or converts waste products from agricultural crops, forestlands, and municipal solid wastes into liquid and gas fuels for heat or electricity generation.

Wind power, which uses modern wind-capturing turbines to generate electricity.



In the Wind, Under the Sun, and Beneath the Earth

Potential users of renewable energy technologies may be unaware of recent progress in the development of renewable energy sources, as well as the economic benefits of using renewables, the high levels of reliability of these technologies, and ways to make renewables part of an overall energy system.

Shining Examples

- A National Wind Coordinating Committee established by electric utilities, utility trade organizations, manufacturers of wind turbine equipment, consumer groups, environmental organizations, state and federal regulators, and the U.S. Department of Energy has instituted experimental projects in six northeastern, midwestern, and southeastern sites. By the year 2000, the resulting savings in energy costs are expected to reach $484 million.
- The Department of Energy is working closely with industry to develop photovoltaic systems for harnessing the rays of the sun to generate power. The goals are to reduce the price of electricity produced by photovoltaic modules, extend their lifetime to 30 years, and increase their efficiency. During the 1996 Olympics in Atlanta, the swimming competitions took place under lights powered by photovoltaics.
- The Department of Energy also has initiated collaborative efforts with private industry to address the need for growing and harvesting crops that can be turned into biomass fuels and to reclaim waste products from agricultural crops and forestlands for generating electricity. Two demonstrations of advanced technologies are up and running, the Vermont Gasifier Project and the Hawaii Biomass Gasifier Facility.
- The Department of Energy also is accelerating commercial operation of cost-shared geothermal projects, including development of a pipeline that involves geysers in California. In addition, a consortium of more than 70 utility companies, including 8 of the nation's top 12 utilities, is promoting the use of geothermal heat pumps, one of the most efficient technologies for providing heat, cooling, and hot water to residential and commercial buildings.

To learn how you can help stop global warming, open this brochure all the way. You'll find a poster you can hang in a spot where others also can read how to combat global warming.

U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Reduce your home energy bill.

You can save up to 40 percent in energy costs by purchasing home products that display the ENERGY STAR® label.

Try a low-energy home.

When buying or building a new house, an ENERGY STAR® model gives greater quality and comfort as well as lower monthly costs.

Reduce, reuse, recycle.

Buy products that feature reusable, recyclable, or reduced packaging to save the energy required to manufacture new containers.

Consider a fuel-smart car.

When buying a car, purchase a fuel-efficient vehicle—one that gets more miles to the gallon than your current vehicle.

Think about giving your car a day off.

monthly costs.

Reduce, reuse, recycle.

Buy products that feature reusable, recyclable, or reduced packaging to save the energy required to manufacture new containers.

Consider a fuel-smart car.

When buying a car, purchase a fuel-efficient vehicle—one that gets more miles to the gallon than your current vehicle.

Think about giving your car a day off.

Consider transportation alternatives such as mass transit, car pooling, bicycling, and telecommuting. When you do drive, keep your car tuned up and its tires properly inflated to save on fuel costs.

RE

The U.S. Environmental Protection Agency publishes a nu
Call EPA's **Fax-On-Demand Service (202-260-2860)** or access E

The **ENERGY STAR®** label, which stands for high efficiency, is found on c
Products with this label will help save money on your utility bills while reducing greer
are working with manufacturers to ensure that even more proc

Tune up your home to save dollars.

Insulate using ENERGY STAR® guidelines, caulk windows and doors, and tune up your furnace and air conditioner.

Encourage your utility to do its part.

Many local utility companies offer energy from clean sources (landfill gas recovery, high-efficiency natural gas-fired power plants, or renewables such as solar and wind).

Get involved at work.

Your company can save money by joining EPA programs such as Green Lights®, ENERGY STAR® Buildings, and Waste Wi$e recycling programs, and by buying office equipment with the ENERGY STAR® label.

Plant trees.

Trees absorb carbon dioxide, a greenhouse gas, from the air. Join family members, neighbors, or community service groups in planting trees in your yard, along roadways, and in parks.

Educate others.

fired power plants, or renewables such as solar and wind).

Get involved at work.

Your company can save money by joining EPA programs such as Green Lights®, ENERGY STAR® Buildings, and Waste Wi$e recycling programs, and by buying office equipment with the ENERGY STAR® label.

Plant trees.

Trees absorb carbon dioxide, a greenhouse gas, from the air. Join family members, neighbors, or community service groups in planting trees in your yard, along roadways, and in parks.

Educate others.

Let friends and family know about these practical, energy-saving steps they can take to save money while protecting the environment.

RCES

of fact sheets about global warming and energy conservation.
lobal warming Internet site at **http://www.epa.gov/globalwarming**.

E

uipment, home heating and cooling equipment, and some home appliances
gas emissions. The U.S. Environmental Protection Agency and U.S. Department of Energy
l be carrying this label. **For more information, call 1-888-STAR-YES.**