

ISSUE : GLOBAL WARMING

Global Warming Basics

Source: nrdc.org

What it is, how it's caused, and what needs to be done to stop it.

What it is?

Earth's atmosphere contains certain gases called greenhouse gases (mostly water vapor and carbon dioxide) which act to keep the lower layers of the atmosphere warmer than they otherwise would be without those gases. "Global Warming" is the expected slow, gradual warming of the lower layers of the Earth's lower atmosphere by the slowly increasing concentrations of man-made greenhouse gases, primarily carbon dioxide, and to a lesser extent methane. These gases trap infrared radiation, which is the "heat radiation" that cools the Earth. (In order for the Earth to remain at a constant temperature, the Earth must lose as much energy through infrared radiation as it gains from the sun. This concept is called energy balance.) The burning of fossil fuels, mainly petroleum and coal, produces carbon dioxide as one of the by-products. As of 2003, the concentration of carbon dioxide is over 50% higher than it was before the start of the industrial revolution in the late 1800's—which is when the burning of fossil fuels really took off.

What causes global warming?

Carbon dioxide and other air pollution that is collecting in the atmosphere like a thickening blanket, trapping the sun's heat and causing the planet to warm up. Coal-burning power plants are the largest U.S. source of carbon dioxide pollution -- they produce 2.5 billion tons every year. Automobiles, the second largest source, create nearly 1.5 billion tons of CO₂ annually.

Here's the good news: technologies exist today to make cars that run cleaner and burn less gas, modernize power plants and generate electricity from nonpolluting sources, and cut our electricity use through energy efficiency. The challenge is to be sure these solutions are put to use.

Is the earth really getting hotter?

Yes. Although local temperatures fluctuate naturally, over the past 50 years the average global temperature has increased at the fastest rate in recorded history. And experts think the trend is accelerating: the 10 hottest years on record have all occurred since 1990. Scientists say that unless we curb global warming emissions, average U.S. temperatures could be 3 to 9 degrees higher by the end of the century. Are warmer temperatures causing bad things to happen? Global warming is already causing damage in many parts of the United States. In 2002, Colorado, Arizona and Oregon endured their worst wildfire seasons ever. The same year, drought created severe dust storms in Montana, Colorado and Kansas, and floods caused hundreds of millions of dollars in damage in Texas, Montana and North Dakota. Since the early 1950s, snow accumulation has declined 60 percent and winter seasons have shortened in some areas of the Cascade Range in Oregon and Washington.

Of course, the impacts of global warming are not limited to the United States. In 2003, extreme heat waves caused more than 20,000 deaths in Europe and more than 1,500 deaths in India. And in what scientists regard as an alarming sign of events to come, the area of the Arctic's perennial polar ice cap is declining at the rate of 9 percent per decade.

Is global warming making hurricanes worse?

Global warming doesn't create hurricanes, but it does make them stronger and more dangerous. Because the ocean is getting warmer, tropical storms can pick up more energy and become more powerful. So global warming could turn, say, a category 3 storm into a much more dangerous category 4 storm. In fact, scientists

have found that the destructive potential of hurricanes has greatly increased along with ocean temperature over the past 35 years.

Is there really cause for serious concern?

Yes. Global warming is a complex phenomenon, and its full-scale impacts are hard to predict far in advance. But each year scientists learn more about how global warming is affecting the planet, and many agree that certain consequences are likely to occur if current trends continue. Among these:

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- Melting glaciers, early snowmelt and severe droughts will cause more dramatic water shortages in the American West.
 - Rising sea levels will lead to coastal flooding on the Eastern seaboard, in Florida, and in other areas, such as the Gulf of Mexico.
 - Warmer sea surface temperatures will fuel more intense hurricanes in the southeastern Atlantic and Gulf coasts.
 - Forests, farms and cities will face troublesome new pests and more mosquito-borne diseases.
 - Disruption of habitats such as coral reefs and alpine meadows could drive many plant and animal species to extinction.

Could global warming trigger a sudden catastrophe?

Recently, researchers -- and even the U.S. Defense Department -- have investigated the possibility of abrupt climate change, in which gradual global warming triggers a sudden shift in the earth's climate, causing parts of the world to dramatically heat up or cool down in the span of a few years.

In February 2004, consultants to the Pentagon released a report laying out the possible impacts of abrupt climate change on national security. In a worst-case scenario, the study concluded, global warming could make large areas of the world uninhabitable and cause massive food and water shortages, sparking widespread migrations and war.

While this prospect remains highly speculative, many of global warming's effects are already being observed -- and felt. And the idea that such extreme change is possible underscores the urgent need to start cutting global warming pollution.

What country is the largest source of global warming pollution?

The United States. Though Americans make up just 4 percent of the world's population, we produce 25 percent of the carbon dioxide pollution from fossil-fuel burning -- by far the largest share of any country. In fact, the United States emits more carbon dioxide than China, India and Japan, combined. Clearly America ought to take a leadership role in solving the problem. And as the world's top developer of new technologies, we are well positioned to do so -- we already have the know-how.

How can we cut global warming pollution?

It's simple: By reducing pollution from vehicles and power plants. Right away, we should put existing technologies for building cleaner cars and more modern electricity generators into widespread use. We can increase our reliance on renewable energy sources such as wind, sun and geothermal. And we can manufacture more efficient appliances and conserve energy.

Why aren't these technologies more commonplace now?

Because, while the technologies exist, the corporate and political will to put them into widespread use does not. Many companies in the automobile and energy industries put pressure on the White House and Congress to halt or delay new laws or regulations -- or even to stop enforcing existing rules -- that would drive such changes. From requiring catalytic converters to improving gas mileage, car companies have fought even the smallest measure to protect public health and the environment. If progress is to be made, the American people will have to demand it.

Do we need new laws requiring industry to cut emissions of global warming pollution?

Yes. The Bush administration has supported only voluntary reduction programs, but these have failed to stop the growth of emissions. Even leaders of major corporations, including companies such as DuPont, Alcoa and General Electric, agree that it's time for the federal government to create strong laws to cut global warming pollution. Public and political support for solutions has never been stronger. Congress is now considering fresh proposals to cap emissions of carbon dioxide and other heat-trapping pollutants from America's largest sources -- power plants, industrial facilities and transportation fuels.

Stricter efficiency requirements for electric appliances will also help reduce pollution. One example is the 30 percent tighter standard now in place for home central air conditioners and heat pumps, a Clinton-era achievement that will prevent the emission of 51 million metric tons of carbon -- the equivalent of taking 34 million cars off the road for one year. The new rule survived a Bush administration effort to weaken it when, in January 2004, a federal court sided with an NRDC-led coalition and reversed the administration's rollback.

Is it possible to cut power plant pollution and still have enough electricity?

Yes. First, we must use more efficient appliances and equipment in our homes and offices to reduce our electricity needs. We can also phase out the decades-old, coal-burning power plants that generate most of our electricity and replace them with cleaner plants. And we can increase our use of renewable energy sources such as wind and sun. Some states are moving in this direction: California has required its largest utilities to get 20 percent of their electricity from renewable sources by 2017, and New York has pledged to compel power companies to provide 25 percent of the state's electricity from renewable sources by 2013.

How can we cut car pollution?

Cost-effective technologies to reduce global warming pollution from cars and light trucks of all sizes are available now. There is no reason to wait and hope that hydrogen fuel cell vehicles will solve the problem in the future. Hybrid gas-electric engines can cut global warming pollution by one-third or more today; hybrid sedans, SUVs and trucks from several automakers are already on the market.

But automakers should be doing a lot more: They've used a legal loophole to make SUVs far less fuel efficient than they could be; the popularity of these vehicles has generated a 20 percent increase in transportation-related carbon dioxide pollution since the early 1990s. Closing this loophole and requiring SUVs, minivans and pick-up trucks to be as efficient as cars would cut 120 million tons of carbon dioxide pollution a year by 2010. If automakers used the technology they have *right now* to raise fuel economy standards for new cars and light trucks to a combined 40 m.p.g., carbon dioxide pollution would eventually drop by more than 650 million tons per year as these vehicles replaced older models.

What can I do to help fight global warming?

There are many simple steps you can take right now to cut global warming pollution. Make conserving energy a part of your daily routine. Each time you choose a compact fluorescent light bulb over an incandescent bulb, for example, you'll lower your energy bill and keep nearly 700 pounds of carbon dioxide out of the air over the bulb's lifetime. By opting for a refrigerator with the Energy Star label -- indicating it uses at least 15 percent less energy than the federal requirement -- over a less energy-efficient model, you can reduce carbon dioxide pollution by nearly a ton in total.

Comparison of Pasterze Glacier (site Austria):

Below



Picture clicked in 1875 - photo courtesy H. Slupetzky/University of Salzburg

Picture clicked in 2004 – photo courtesy Gary Braasch