Global warming

Global warming was once an uncommon term used by a few scientists who were growing concerned over the effects of decades of pollution on long-term weather patterns. Today, the idea of global warming is well known, if not well understood. It is not unusual to hear someone complaining about a hot day or a freak storm and remark, "It's global warming."

Well, is it? In this article, we'll learn what global warming is, what causes it, what its current effects are and what the future effects could be. Although there has been a scientific consensus on global warming, some aren't sure it's something we need to worry about. We'll examine some proposed changes in the United States' national policies related to curbing global warming and the criticisms and concerns surrounding them.

Global warming is a significant increase in the Earth's climatic temperature over a relatively short period of time as a result of the activities of humans.

In specific terms, an increase of 1 or more Celsius degrees in a period of one hundred to two hundred years would be considered global warming. Over the course of a single century, an increase of even 0.4 degrees Celsius would be significant. The Intergovernmental Panel on Climate Change (IPCC), a group of over 2,500 scientists from countries across the world, convened in Paris in February, 2007 to compare and advance climate research. The scientists determined that the Earth has warmed .6 degrees Celsius between 1901 and 2000. When the timeframe is advanced by five years, from 1906 to 2006, the scientists found that the temperature increase was .74 degrees Celsius.

Other observations from the IPCC include:

- Of the last 12 years, 11 have ranked among the warmest years since 1850.
- The warming trend of the last 50 years is nearly double that of the last 100 years, meaning that the rate of warming is increasing.
- The ocean's temperature has increased at least to depths of 3,000 meters (over 9,800 feet); the ocean absorbs more than 80 percent of all heat added to the climate system.
- Glaciers and snow cover have decreased in regions both in the Northern and Southern hemispheres, which has contributed to the rise of sea levels.
- Average Arctic temperatures increased by nearly twice the global average rate over the last 100 years (the IPCC also noted that Arctic temperatures have are highly variable from decade to decade).
- The area covered by frozen ground in the Arctic has decreased by approximately 7 percent since 1900, with seasonal decreases of up to 15 percent.
- Precipitation has increased in eastern regions of the Americas, northern Europe and parts of Asia; other regions such as the Mediterranean and southern Africa have experienced drying trends.
- Westerly winds have been growing stronger.
- Droughts are more intense, have lasted longer and covered larger areas than in the past.
- There have been significant changes in extreme temperatures -- hot days and heat waves have become more frequent while cold days and nights have become less frequent.

- While scientists have not observed an increase in the number of tropical storms, they have observed an increase in the intensity of such storms in the Atlantic correlated with a rise in ocean surface temperatures.

The greenhouse effect happens because of certain naturally occurring substances in the atmosphere. Unfortunately, since the Industrial Revolution, humans have been pouring huge amounts of those substances into the air.

Carbon dioxide (CO_2) is a colorless gas that is a by-product of the combustion of organic matter. It makes up less than 0.04 percent of Earth's atmosphere, most of which was put there by volcanic activity very early in the planet's life. Today, human activities are pumping huge amounts of CO_2 into the atmosphere, resulting in an overall increase in carbon dioxide concentrations [Source: Keeling, C.D. and T.P. Whorf]. These increased concentrations are considered the primary factor in global warming, because carbon dioxide absorbs infrared radiation. Most of the energy that escapes Earth's atmosphere comes in this form, so extra CO_2 means more energy absorption and an overall increase in the planet's temperature.

The Worldwatch Institute reports that carbon emissions worldwide have increased from about 1 billion tons in 1900 to about 7 billion tons in 1995. The Institute also notes that the average surface temperature of Earth has gone from 14.5 degrees C in 1860 to 15.3 degrees C in 1980.

The IPCC says that the pre-industrial amount of CO_2 in the Earth's atmosphere was about 280 parts per million (ppm), meaning that for every million molecules of dry air, 280 of them were CO_2. In contrast, 2005 levels of CO_2 were measured at 379 ppm [Source: IPCC].

Nitrous oxide (NO_2) is another important greenhouse gas. Although the amounts being released by human activities are not as great as the amounts of CO_2, nitrous oxide absorbs much more energy than CO_2 (about 270 times as much). For this reason, efforts to curb greenhouse gas emissions have focused on NO_2 as well [Source: Soil Conservation Council of Canada]. The use of large amounts of nitrogen fertilizer on crops releases nitrous oxide in great quantities, and it is also a by-product of combustion.

Methane is a combustible gas, and it is the main component of natural gas. Methane occurs naturally through the decomposition of organic material and is often encountered in the form of "swamp gas." Man-made processes produce methane in several ways:

- By extracting it from coal
- From large herds of livestock (i.e., digestive gases)
- From the bacteria in rice paddies
- Decomposition of garbage in landfills

Methane acts much like carbon dioxide in the atmosphere, absorbing infrared energy and keeping heat energy on Earth. The IPCC says that methane's concentration in the atmosphere in 2005 was 1,774 parts per billion (ppb) [Source: IPCC]. While there isn't as much methane as carbon dioxide in the atmosphere, methane can absorb and emit twenty times more heat than CO_2 [Source: Hopwood, Nick and Cohen, Jordan]. Some scientists even speculate that a large-scale venting of methane into the atmosphere (such as from the release of huge chunks of methane ice locked under the oceans) could

have created brief periods of intense global warming that led to some of the mass extinctions in the planet's distant past [Source: Discover Magazin].

Though scientists warn that global warming will likely continue for centuries because of the long natural processes involved, there are a few things we can do to decrease the effects. Basically, they all boil down to this: Don't use as much of the stuff that creates greenhouse gases. On a local level, you can help by using less energy. The electricity that operates many of the devices in our homes comes from a power plant, and most power plants burn fossil fuels to generate that power. Turn off lights when they're not in use. Take shorter showers to use less hot water. Use a fan instead of an air conditioner on a warm day.

Here are some other specific ways you can help decrease greenhouse-gas emissions:

- Make sure your car is properly tuned up. This allows it to run more efficiently and generate fewer harmful gases.
- Walk or ride your bike if possible, or carpool on your way to work. Cars burn fossil fuel, so smaller, more fuel-efficient cars emit less CO2, particularly hybrid cars.
- Turn lights and other appliances off when you're not using them. Even though a light bulb doesn't generate greenhouse gas, the power plant that generates the electricity used by the light bulb probably does. Switch from incandescent light bulbs to fluorescent bulbs, which use less energy and last longer.
- Recycle. Garbage that doesn't get recycled ends up in a landfill, generating methane. Recycled goods also require less energy to produce than products made from scratch.
- Plant trees and other plants where you can. Plants take carbon dioxide out of the air and release oxygen.
- Don't burn garbage. This releases carbon dioxide and hydrocarbons into the atmosphere.

For more information, please click the following link:

http://science.howstuffworks.com/global-warming8.htm