

Union of Concerned Scientists

Understanding the Urgency of Climate Change

Why releasing carbon into the atmosphere is like filling a water balloon

Many circumstances require immediate action: consider a full bladder or a red traffic light. We usually address such circumstances without delay, because the consequences of inaction—physical discomfort or legal troubles—are clear.

When it comes to climate change, the urgency of the problem may not seem so obvious, since it doesn't sound an alarm or poke us in the eye. The consequences *appear* to be far away. And we find it hard to comprehend the significant risks posed by global warming, such as the rapid accumulation of carbon dioxide in our atmosphere or the impending rise in sea levels, because we can't, at the moment, see them with the naked eye. Yet if we fail to reduce heat-trapping emissions, we will cross a threshold, and the changes in our world will be irreversible.

Releasing carbon into the atmosphere is sort of like filling a water balloon from an outdoor faucet. If the water is merely trickling in, you can easily remove the balloon from the spout and have room to tie the knot. But if the spigot is gushing and the balloon is swollen with water, you have to act quickly and forcefully to remove it before it bursts.

Human activities, such as burning coal and oil in power plants and cars, have poured excessive amounts of carbon dioxide into the atmosphere, and the natural world just can't absorb it all. Like the swollen water balloon, the atmosphere is overloaded. The problem with adding more carbon dioxide, methane, and nitrous oxide gases to Earth's atmosphere is that they trap heat, causing global temperatures to rise. Even a rise of a degree or two makes a difference in many aspects of the world that people care about. Back in 1960, about 40 percent of a metric ton of emitted CO₂ would remain in the atmosphere. Now that has risen to 45 percent. This means that a ton of CO₂ emissions today traps more heat than it would have fifty years ago.

The evidence that global warming is happening now and that human activities are the primary cause is overwhelming. Indeed, recent research indicates that Earth's climate is changing more quickly than scientists had projected just a few years ago. Last week NASA and the National Oceanic and Atmospheric Administration reported that 2010 has been the warmest year worldwide so far recorded.

At the request of Congress, the National Academy of Sciences released on May 19, 2010 a series of reports that emphasized the urgency of climate change and why the U.S. should act now to reduce emissions of heat-trapping gases. One central point was this: "The longer the nation waits to begin reducing emissions, the harder and more expensive it will likely be to reach any given emissions target."

The panel of scientists at the National Academies determined that we need to go on

a carbon budget, recommending that the United States restrict its carbon emissions to a total of 170 to 200 billion tons of global warming gases from 2012 to 2050. That would represent an 80 percent reduction in carbon emissions compared to current projections. In 2008 alone, the U.S. released 7 billion tons of greenhouse gases. If we maintain business as usual, we'll blow our budget in no time.

For more than 30 years, scientists have presented their research about climate change and possible solutions to U.S. policymakers, but little action has been taken to reduce carbon-emitting activities. If we continue along the high emissions path, projections show that we risk locking in a rise of 3.6 to 9.9 degrees Fahrenheit by 2100. The upper end of that range is considered catastrophic.

Around the world, informed citizens, motivated by an understanding of the science of climate change, are speaking up for urgent action. Cities, countries, and regions are working to limit the magnitude of climate change by lowering carbon dioxide emissions as well as to adapt to the unavoidable impacts of future climate change.

Climate change carries serious consequences both for humans and for ecosystems. This is a crisis that will affect our food, our national security, our water, our ability to live where we choose, and other basic human needs. Whether and how we address global warming is not a question of science, it's a question of values.

Last Revised: 05/27/10

