OUR STORIES / BLOG

Global Climate Change: What You Need to Know

The transition to a clean energy economy is an economical imperative.

February 24, 2021 | Melissa Sommer

Northern Hemisphere

NASA/Goddard Space Flight Center Scientific Visualization Studio/GRC, GPO Project

Record houses. Raging storms. Deadly heat. Climate change manifests itself in myriad ways, and it's the ultimate equation: our footprint, heavy on fossil fuels, heavy over the heads of what causes climate change, frays life affecting the planet, and what we can do about it.

What is climate change?

The term climate refers to the general weather conditions of a place over many years. In the United States, for example, Alaska's climate is cold and snowy in winter while Hawaii's is warm and rainy. Climate change describes a change in the average weather conditions—e.g., conditions becoming warmer, wetter, or drier—over several decades or more. It's the longer-term trend that differentiates climate change from natural weather variability. And while "climate change" and "global warming" are often used interchangeably, global warming—the recent rise in the global average temperature that the earth's surface—is just one aspect of climate change.

How is climate change measured over time?

Earth-orbiting satellites, climate measurement stations, and ocean buoys are used to monitor present day weather and climate, and the Paleoclimatology data from natural sources like ice cores, tree rings, corals, and ocean and lake sediments have enabled scientists to extend their knowledge of Earth's climate back millions of years. These records show that the Earth's climate has changed in response to changes in the atmosphere, oceans, and surface, plus unexplained thrust upon scientists. Scientists then feed this data into supercomputer climate models that predict future climate trends. (UCAR Foundation encyclopedia)

What causes climate change?

The mechanics of the earth's climate system are simple. When energy from the sun is absorbed by the earth's surface, it warms the surface and the air above it. The earth's surface then releases energy, the planet cools. When the earth absorbs the sun's energy, or when atmospheric gases prevent heat released by the earth from radiating into space (the greenhouse effect), the planet warms. In terms of climate, both natural and human, can influence the earth's climate system.

Call on the Biden administration to take bold action in its first 100 days

TAKE ACTION

Report Contribution

Natural causes of climate change

Natural factors influence the amount of solar energy earth and ocean planets in the year, and they affect humans (solar physics). Forces that contribute to climate change include the sun's intensity, volcanic eruptions, and changes in naturally occurring greenhouse gas concentrations. Over the past 100 years, the sun's intensity has remained fairly stable, the opposing volcanic that 100 volcanic. Increasing much faster than past natural and cannot be explained by natural causes alone. According to NASA, These natural causes are still a big today, but their influence is too small or too stable to explain the rapid warming seen in recent decades.

Anthropogenic causes of climate change

Humans—more specifically, the greenhouse gas (GHG) emissions we generate—are the leading cause of the earth's rapidly changing climate. Greenhouse gases play an important role in keeping the planet warm enough to inhabit. But the amount of these gases in the atmosphere has increased dramatically since the Industrial Revolution, integrated-market Fossil or Climate Change (IPCC), concentration of carbon dioxide, methane, and nitrous oxide. These increases in levels unprecedented in at least the last 800,000 years. Instead, the atmospheric share of carbon dioxide—the powerful chief climate change contributor—has risen by 43 percent since preindustrial times.

A coastal town leaning precariously on stilts at sunset

The burning of fossil fuels like coal, oil, and gas for electricity, heat, and transportation is the primary source of human-generated emissions. A second major source is agriculture, including the cultivation of crops and the raising of livestock. Logging, clear-cutting, fires, and other forms of forest degradation contribute up to 15 percent of global carbon emissions. Other human activities that generate air pollution include fertilizer use (a primary source of nitrous oxide emissions), livestock production (cattle, buffalo, sheep, and goats are major methane emitters), and certain industrial processes (for example, the production of cement releases carbon dioxide and construction can change the reflectivity of the earth's surface, leading to local warming or cooling, too.

Though our planet's forests and oceans absorb greenhouse gases from the atmosphere, the rate at which we are adding greenhouse gases to the atmosphere also can't keep up with our rising emissions. The resulting buildup of greenhouse gases is causing alarmingly fast warming worldwide. It's estimated that the earth's average temperature has risen 1.4 degrees F since 1880, and the rate of warming has been much faster over the last 100 years. When the current rate of warming continues, the United States alone could by mid-century (2050) see average temperatures even just 5 to 6 degrees colder than the year 2000.

The effects of global climate change

According to the World Economic Forum's 2019 Global Risks Report, the failure to mitigate and adapt to climate change will be the "most impactful risk" facing humanity over the next decade. Climate change is causing a cascade of dangerous destruction and water crises. Blame its cascading effects. As climate change transforms global ecosystems, it affects everything from the places we live to the water we drink to the air we breathe.

Average weather

A Florida beach after a storm in Fort Lauderdale, Florida, United States, on Friday, June 5, 2020

Shutterstock

As the earth's atmosphere heats up, it collects, retains, and stops more water. Changing weather patterns and rearing near water areas and dry areas drive. Higher temperatures worsen and increase the frequency of many types of disasters, including storms, floods, heat waves, and droughts. These events can have devastating and costly impacts on communities, including loss of life, property damage, and costly rebuilding, damaging property, creating hazardous medical safety, potential for and leading to loss of life.

Dirty air

Smog in Los Angeles, California, United States

Getty Images/Bloomberg

Air pollution and climate change are inextricably linked, with one exacerbating the other. Where the earth's temperatures rise, not only does our air quality deteriorate—ozone pollution, for example, is a result of the sun's rays and hot temperatures—but we are creating much thanks to greenhouse gas emissions generated from fossil fuels and pollen due to longer, stronger pollen seasons).

Health risks

The Aedes mosquito can spread serious diseases such as dengue fever, yellow fever, and Zika virus.

Getty Images/Medical Image Bank: Pangean

According to the World Health Organization, climate change is responsible for some approximately 150,000 additional deaths per year between 2030 and 2050. As global temperatures rise, so do the number of epidemics and diseases that cause heat-related illnesses, heatstrokes, and cardiovascular and kidney disease. As air pollution worsens, so does the number of people who suffer from respiratory illnesses, such as asthma and bronchitis. Ozone is also a pollutant and could be carried by dust and settling surfaces, too. Extreme weather events, such as severe storms and flooding, can lead to injury, drowning water contamination, and disease. Climate change can also disrupt supply chains infrastructure or lead to community displacement. Indeed, Hakkinen Sakes, Ph.D., Ph.D., Ph.D.,

Trump Watch →

NRDC tracks the Trump administration's assaults on the environment.

NRDC IN ACTION

Keeping a Close Watch on China's Climate Transition →

JingJing Qian, director of NRDC's China program, is bearing witness to some truly remarkable changes taking place in her home country. She's also helping to make those changes happen.

PERSONAL ACTION

How to Call Congress →

Sometimes the best way to turn your anger into action is to pick up the phone. Follow these tips to minimize your anxiety and maximize your impact.

ONEARTH STORY

Climate Change on Trial in Federal Court →

California cities square off against oil companies in a debate over who's to blame for a warming planet.

ONEARTH STORY

If You Care About Kids, You Care About Climate →

If we really want to protect our children, we'll need to focus on the actual threats to their health and well-being—like drought, flooding, disease, and war.

ONEARTH STORY

Week 82: Indestructible (Yet Combustible) Coal? →

Trump is confused about coal, NHTSA is confused about math, and Zinke is confused about climate change.

EXPLAINER

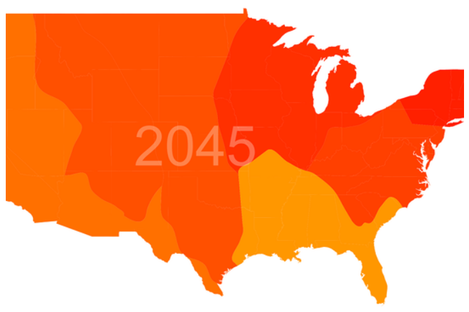
Are the Effects of Global Warming Really that Bad? →

Short answer: Yes. Even a seemingly slight average temperature rise is enough to cause a dramatic transformation of our planet.

PERSONAL ACTION

Go Green in Margaritaville: Eco-Friendly Beach Vacation Tips →

Make long-lasting memories but a minimal environmental impact during your spring break getaway.



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