

The Citizen's Guide to Climate Change

The biggest complaint that people (ordinary people, not brainiacs) have about the whole business of Climate Change is “it’s too complex.” Well, this is a climate change guide made just for you, for us, the ordinary people. We aren’t scientists, and we do care what’s happening with the change in climate. We really do. But we need to be able to get a handle on it without a doctorate degree. We don’t want or need volumes of data and graphs and pie charts and all the rest of that. We just want the facts, straight and simple.

So here ya go!

WHERE ARE WE? WHAT IS OUR CURRENT SITUATION?

From NASA:

In the past century, the temperature has climbed 0.8 degrees Celsius, roughly ten times faster than the average rate of ice-age-recovery warming. Models predict that Earth will warm between 2 and 6 degrees Celsius in the next century [because of what?]. When global warming has happened at various times in the past two million years, it has taken the planet about 5,000 years to warm 5 degrees. The predicted rate of warming for the next century is at least 20 times faster. This rate of change is extremely unusual.

The rate of warming is increasing. The 20th century's last two decades were the hottest in 400 years and possibly the warmest for several millennia, according to a number of climate studies.

Average temperatures have climbed 1.4 degrees Fahrenheit (0.8 degree Celsius) around the world since 1880, much of this in recent decades, according to NASA's Goddard Institute for Space Studies.

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. In the Northern Hemisphere, 1983–2012 was likely the warmest 30-year period of the last 1400 years (medium confidence). Source: IPCC Report

The 12 hottest years on record have all come in the last 15 years. Temperatures have exceeded global averages for 36 consecutive years. Source :WRI

The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the

emitted anthropogenic carbon dioxide, causing ocean acidification.
Source: IPCC Report

Humans are pouring carbon dioxide into the atmosphere much faster than plants and oceans can absorb it. source: IPCC Report

Carbon Emissions in the Industrial Age

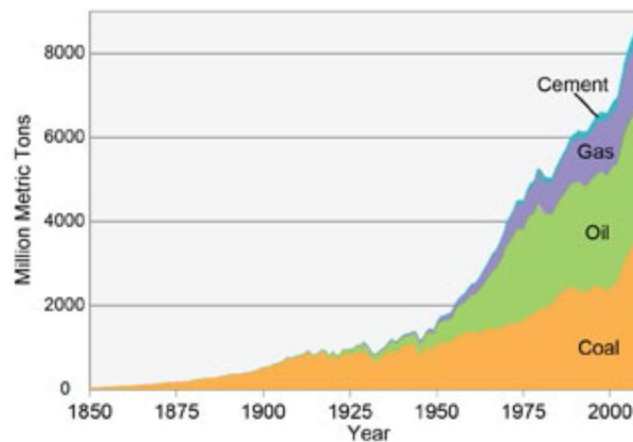


Figure 4. Global carbon emissions from burning coal, oil, and gas and from producing cement (1850-2009). These emissions account for about 80% of the total emissions of carbon from human activities, with land-use changes (like cutting down forests) accounting for the other 20% in recent decades. (Data from Boden et al. 2012³). Source: NCA3 Report

The United States and China account for almost 50% of greenhouse gas emissions. (source: NAVIGATING THE NUMBERS : GREENHOUSE GAS DATA AND INTERNATIONAL CLIMATE POLICY)

WHERE ARE WE PREDICTABLY HEADED?

Arctic ice is rapidly disappearing, and the region may have its first completely ice-free summer by 2040 or earlier. Polar bears and indigenous cultures are already suffering from the sea-ice loss. (source: National Geographic)

A follow-up report by the IPCC released in April 2007 warned that global warming could lead to large-scale food and water shortages and have catastrophic effects on wildlife.

- Sea level could rise between 7 and 23 inches (18 to 59 centimeters) by century's end, the IPCC's February 2007 report projects. Rises of just 4 inches (10 centimeters) could flood many South Seas islands and swamp large parts of Southeast Asia.
- Some hundred million people live within 3 feet (1 meter) of mean sea level, and much of the world's population is concentrated in vulnerable coastal cities. In the U.S., Louisiana and Florida are especially at risk.
- Glaciers around the world could melt, causing sea levels to rise while creating water shortages in regions dependent on runoff for fresh water.
- Strong hurricanes, droughts, heat waves, wildfires, and other natural disasters may become commonplace in many parts of the world. The growth of deserts may also cause food shortages in many places.
- The ocean's circulation system, known as the ocean conveyor belt, could be permanently altered, causing a mini-ice age in Western Europe and other rapid changes.
- At some point in the future, warming could become uncontrollable by creating a so-called positive feedback effect. Rising temperatures could release additional greenhouse gases by unlocking methane in permafrost and undersea deposits, freeing carbon trapped in sea ice, and causing increased evaporation of water.

(Reuters) - More than 100 million people will die and global economic growth will be cut by 3.2 percent of gross domestic product (GDP) by 2030 if the world fails to tackle climate change, a report commissioned by 20 governments said on Wednesday [Which Wednesday?]

As global average temperatures rise due to greenhouse gas emissions, the effects on the planet, such as melting ice caps, extreme weather, drought and rising sea levels, will threaten populations and livelihoods, said the report conducted by humanitarian organization DARA.

It calculated that five million deaths occur each year from air pollution, hunger and disease as a result of climate change and carbon-intensive economies, and that toll would likely rise to six million a year by 2030 if current patterns of fossil fuel use continue.

Scientists estimate that over the past 150 years humans have altered nearly 47 per cent of the Earth's land surface.

The World Atlas of Biodiversity, published by the United Nations, suggests that the complex but delicate interaction between terrestrial plants and animals will be threatened on almost three quarters of the total land surface within the next 30 years.

Human beings are currently causing the greatest mass extinction of species since the extinction of the dinosaurs 65 million years ago. If present trends continue one half of all species of life on earth will be extinct in less than 100 years, as a result of habitat destruction, pollution, invasive species, and climate change.

Although it's difficult to predict the future extinction risk, some scientists have found that 18 to 35% of plant and animal species will be committed to extinction by 2050 due to climate change. (Source: Weather Underground)

- More than a million species face extinction from disappearing habitat, changing ecosystems, and acidifying oceans.

By 2050, global average temperature could be between 1.4°C and 3°C warmer than it was just a couple of decades ago, according to a new study that seeks to address the largest sources of uncertainty in current climate models. That's substantially higher than estimates produced by other climate analyses, suggesting that Earth's climate could warm much more quickly than previously thought.

From National Geographic:

It took a long time for nations to set a speed limit on the road to a warming world. But for the past four years, even though negotiators have never arrived at a plan for avoiding dangerous climate change, they have agreed on a goal: limiting the increase in the Earth's global average surface temperature to 2°C (3.6°F) above the preindustrial level.

Now, two Union of Concerned Scientists (UCS) climate scientists and two colleagues argue that policymakers need to acknowledge that the world is already on track for warming beyond 2°C.

According to a new paper published yesterday in the journal *Nature Climate Change*, carbon dioxide emissions will rise by 2.6 percent this year, fueled by major increases in China and India. This follows a record year in 2011, when countries pumped 3.1 percent more global warming pollution into the atmosphere — making it very likely that the world will blow past the 2 degree C warming threshold that scientists and international negotiators agree is needed to avoid catastrophic consequences. Some even call global warming of 2 degrees C, which is on the lowest end of projections, a “prescription for disaster.”

Here's how one of the report's authors characterized the problem when talking to *The Guardian*:

Current emissions growth is **placing the world on a path to warm between 4C and 6C**, says the study, with global emissions jumping 58% between 1990 and this year. The study focuses on emissions from burning fossil fuels and cement production.

“Unless large and concerted global mitigation efforts are initiated soon, **the goal of remaining below 2C will soon become unachievable**,” say the authors.

HOW MUCH TIME DO WE HAVE BEFORE WE’RE TOTALLY SCREWED?

10 years

“WHAT HAS TO HAPPEN/WHAT IT LOOKS LIKE” TO EFFECTIVELY* IMPACT THE SITUATION?

* Effectively (definition) – taking the right actions at the right times to produce the right outcomes that together result in in-time mitigation

To meet the lower emissions scenario (B1) used in this assessment, global mitigation actions would need to limit global carbon dioxide emissions to a peak of around 44 billion tons per year within the next 25 years and decline thereafter. In 2011, global emissions were around 34 billion tons, and have been rising by about 0.9 billion tons per year for the past decade.

Therefore, the world is on a path to exceed 44 billion tons per year within a decade. Source: White House National Assessment

From James Hansen, director of the NASA Goddard Institute for Space Studies in New York, whose data since the 1980s has been central to setting that benchmark (2 degrees) which he now says is too much: Hansen concluded with a message to negotiators at the current climate talks in Durban, South Africa. If the world begins reducing CO2 emissions by 6 percent a year starting in 2012, Hansen said, atmospheric levels can return to the “safe” level of 350 ppm that he and others have long called for. “If the world waits until 2020 to begin,” he noted, “it will need to reduce CO2 by 15 percent a year to reach 350 ppm. We are out of time.”

It is not generally appreciated that 2C refers to the equilibrium warming, which is up to double the realized/transient warming at the time of atmospheric GHG stabilization. To be sure of the global temperature stabilizing at 2C, warming has to be limited to 1C by 2100, so our 2100 limit is 1C however we look at it. 2C by 2100 is certain total catastrophe because it will become 4C over the very long term after 2100- or more if we factor in all amplifying carbon feedbacks resulting from a 4C warming.

In 2009 Jorgen Randers and Paul Gilding proposed “The One Degree War Plan” saying that the public will demand emergency action to cut global climate gas emissions and that such emergency action ought to seek to keep global warming below plus one degree Centigrade over pre-industrial levels.

2C has never been described as safe, and there is no science basis of 2C as a danger limit.

Climate change assessments make it obvious 2C is far beyond dangerous by any definition and 1C is the danger limit.

However, without an all-out global emergency response, including drastic measures to cool the Arctic and draw down CO₂ from the air, it is practically impossible now to avoid going much higher than 2C. This reality is being denied as 'unthinkable'.