

# Climate Change

## What Is It?

A change in global or regional climate patterns. Anthropogenic climate change refers to changes to climate attributed to human activity, while natural climate change refers to geologic, oceanic, solar, and other dynamic systems interacting to impact climate patterns.



## How Is It Caused?

A number of natural systems interact with one another, in addition to gases entering the atmosphere known to trap heat. Carbon dioxide and other emissions are mainly identified as contributing to anthropogenic climate change.

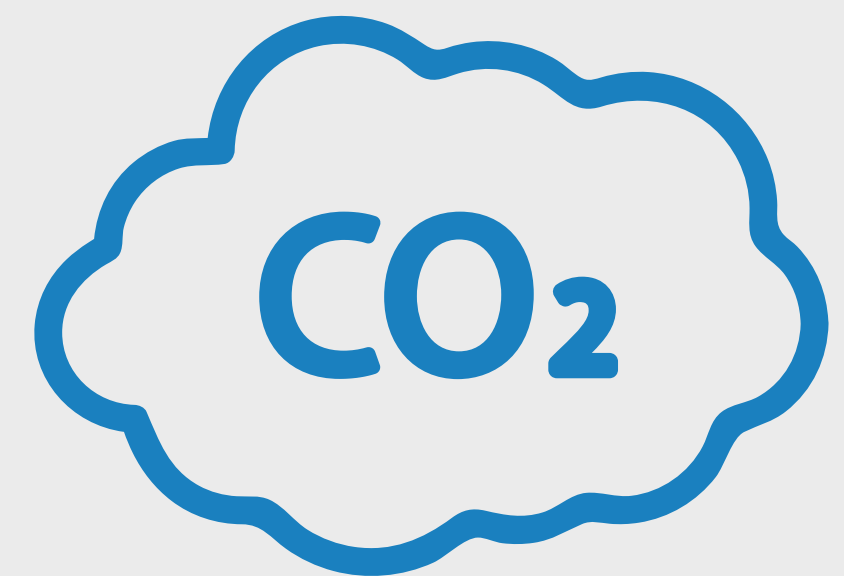
## What Is Its Impact?

The impacts of climate change can vary widely and are typically measured as rising global temperatures. The impacts can manifest as loss of sea ice, rising sea levels, regional droughts, changes in wildlife habitats and migration, and in many other ways.



## How Does It Work?

1. The sun radiates heat towards the earth, which absorbs then reradiates heat into the atmosphere.
2. Water vapor, methane, carbon dioxide, and other gases, trap heat in the atmosphere.
3. Large-scale utilization of hydrocarbon fuels, and emissions from natural sources, increase the concentration of greenhouse gases in the atmosphere.
4. The heat that is trapped impacts weather and ecological conditions.
5. Different regions experience this differently, some as drought, others as more rain, and these can impact everything from public health to agriculture to infrastructure stability.



## Space



From an atmospheric standpoint, climate change is generally measured through temperatures around the globe. A key factor behind temperature changes is the concentration of greenhouse gases. The current concentration of CO<sub>2</sub> in the atmosphere is over 420 parts per million (ppm), about 50% higher than preindustrial levels.

## Point

- Coastal populations and infrastructure may be threatened by storms and rising sea levels.
- An increase in temperature will likely lead to the melting of ice caps and sea-level rise worldwide.
- Rising temperatures can melt permafrost, leading to infrastructure instability in colder regions.
- Heat and drought can damage crops, inhibit agriculture, or create food scarcity while leading to heat-related deaths.
- CO<sub>2</sub> concentrations and global temperature rise may be forestalled by switching to renewable forms of energy and away from hydrocarbons.

## Counterpoint

- Sea-level rise is relatively slow, allowing most coastal populations time to adapt with more resilient infrastructure.
- Melted ice caps create new shipping and trade routes, increasing economic opportunities.
- Melting permafrost can create newly usable land for agriculture and other infrastructure.
- Higher CO<sub>2</sub> concentrations and warmer weather can increase crop yields while reducing overall climate-related deaths, which primarily come from cold exposure.
- The most cost-effective solutions to climate issues are investments in resilient infrastructure, while switching from hydrocarbons can create energy insecurity.

## Did You Know?

In addition to weather and temperature monitoring stations around the world, satellites are able to measure temperature, sea ice, cloud activity, canopy cover, and other global changes.

## What's Next?

Advancements in innovative technologies like carbon capture, alternative fuels, and renewable energy sources are constantly improving. One technique called direct air capture can even pull carbon dioxide straight out of the atmosphere. Combining these developments, certain sectors may soon be carbon neutral or even carbon negative. Additionally, resilient infrastructure can protect people from climate phenomena that may develop in the future.