Global warming occurs when carbon dioxide (CO2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth’s surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants—specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases—are known as greenhouse gases, and their impact is called [the greenhouse effect](https://www.nrdc.org/stories/what-are-causes-climate-change#natural).

Since the Industrial Revolution, the global annual temperature has increased in total by a little more than 1 degree Celsius, or about 2 degrees Fahrenheit. Between 1880—the year that accurate recordkeeping began—and 1980, it rose on average by 0.07 degrees Celsius (0.13 degrees Fahrenheit) every 10 years.

 Since 1981, however, the rate of increase has more than doubled: For the last 40 years, we’ve seen the global annual temperature rise by 0.18 degrees Celsius, or 0.32 degrees Fahrenheit, per decade.

The result? A planet that has [never been hotter](https://www.noaa.gov/news/2019-was-2nd-hottest-year-on-record-for-earth-say-noaa-nasa). Nine of the 10 warmest years since 1880 have occurred since 2005—and the 5 warmest years on record have all occurred since 2015. Climate change deniers have argued that there has been a “pause” or a “slowdown” in rising global temperatures, but numerous studies, including a [2018 paper](https://iopscience.iop.org/article/10.1088/1748-9326/aaf342/meta) published in the journal Environmental Research Letters, have disproved this claim. The impacts of global warming are [already harming people](https://www.nrdc.org/issues/climate-adaptation) around the world.

Now [climate scientists have concluded](https://www.nrdc.org/onearth/climate-scientists-world-we-have-only-20-years-theres-no-turning-back) that we must limit global warming to 1.5 degrees Celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects: the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as [climate change](https://www.nrdc.org/stories/global-climate-change-what-you-need-know). These effects are felt by all people in one way or another but are [experienced most acutely](https://www.dw.com/en/climate-change-reinforces-inequalities-even-in-developed-countries/a-50596957) by the underprivileged, the economically marginalized, and people of color, for whom climate change is often a key driver of poverty, displacement, hunger, and social unrest.

Though [natural](https://www.nrdc.org/stories/what-are-causes-climate-change#natural) cycles and fluctuations have caused the earth’s climate to change several times over the last 800,000 years, our current era of global warming is directly attributable to [human](https://www.nrdc.org/stories/what-are-causes-climate-change#human) activity—specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect. In the United States, the largest source of greenhouse gases is transportation (29 percent), followed closely by electricity production (28 percent) and industrial activity (22 percent). Learn about the natural and human [causes of climate change](https://www.nrdc.org/stories/what-are-causes-climate-change).

Curbing dangerous [climate change](https://www.nrdc.org/stories/what-climate-change) requires very deep cuts in emissions, as well as the use of alternatives to fossil fuels worldwide. The good news is that countries around the globe have formally committed—as part of the [2015 Paris Climate Agreement](https://www.nrdc.org/stories/paris-climate-agreement-everything-you-need-know)—to lower their emissions by setting new standards and crafting new policies to meet or even exceed those standards.

But it is not working fast enough so if we want to save the planet then we will have to take action quicker.

To avoid the worst impacts of climate change, scientists tell us that we need to reduce global carbon emissions by as much as 40 percent by 2030. For that to happen, the global community must take immediate steps.

**Greenhouse gas emissions** from human activities strengthen the [greenhouse effect](https://en.wikipedia.org/wiki/Greenhouse_effect), contributing to [climate change](https://en.wikipedia.org/wiki/Climate_change). Most is [carbon dioxide](https://en.wikipedia.org/wiki/Carbon_dioxide) from burning [fossil fuels](https://en.wikipedia.org/wiki/Fossil_fuel): [coal](https://en.wikipedia.org/wiki/Coal), [oil](https://en.wikipedia.org/wiki/Petroleum), and [natural gas](https://en.wikipedia.org/wiki/Natural_gas). The [largest emitters](https://en.wikipedia.org/wiki/Top_contributors_to_greenhouse_gas_emissions) include [coal in China](https://en.wikipedia.org/wiki/Coal_in_China) and [large oil and gas companies](https://en.wikipedia.org/wiki/Big_Oil), many [state-owned by OPEC and Russia](https://en.wikipedia.org/wiki/OPEC#OPEC+). Human-caused emissions have increased [atmospheric carbon dioxide](https://en.wikipedia.org/wiki/Carbon_dioxide_in_Earth%27s_atmosphere) by about 50% over pre-industrial levels. The growing levels of emissions have varied, but it was consistent among all greenhouse gases (GHG). Emissions in the 2010s averaged 56 billion tons a year, higher than ever before.

[Electricity generation](https://en.wikipedia.org/wiki/Electricity_generation) and [transport](https://en.wikipedia.org/wiki/Transport) are major emitters, the largest single source being [coal-fired power stations](https://en.wikipedia.org/wiki/Coal-fired_power_station) with 20% of GHG

[Deforestation](https://en.wikipedia.org/wiki/Deforestation) and other changes in land use also emit carbon dioxide and [methane](https://en.wikipedia.org/wiki/Methane). The largest source of anthropogenic [methane emissions](https://en.wikipedia.org/wiki/Methane_emissions) is [agriculture](https://en.wikipedia.org/wiki/Greenhouse_gas_emissions_from_agriculture), closely followed by [gas venting](https://en.wikipedia.org/wiki/Gas_venting) and [fugitive emissions](https://en.wikipedia.org/wiki/Fugitive_emissions) from the [fossil-fuel industry](https://en.wikipedia.org/wiki/Fossil_fuel_industry).

Livestock like cows, horses, etc release lots of methane by expelling gas and they contribute to most of the greenhouse gas emissions from agriculture.

Global [greenhouse gas](https://en.wikipedia.org/wiki/Greenhouse_gas) emissions are about 50 Gt per year (6.6t per person) and for 2019 have been estimated at 57 Gt CO2 eq including 5 Gt due to land use change. In 2019, approximately 34% [20 GtCO2-eq] of total net anthropogenic GHG emissions came from the energy supply sector, 24% [14 GtCO2-eq] from industry, 22% [13 GtCO2-eq]from agriculture, forestry and other land use (AFOLU), 15% [8.7 GtCO2-eq] from transport and 6% [3.3 GtCO2-eq] from buildings.

**Carbon dioxide (CO2) makes up the vast majority of greenhouse gas emissions from the sector, but smaller amounts of methane (CH4) and nitrous oxide (N2O) are also emitted**. These gases are released during the combustion of fossil fuels, such as coal, oil, and natural gas, to produce electricity.