

US EPA ARCHIVE DOCUMENT



EPA's Endangerment Finding

Climate Change Facts

The key scientific facts that support EPA's determination that greenhouse gases in the atmosphere endanger public health and welfare of current and future generations include:

Human Activity Has Increased Greenhouse Gases in the Atmosphere

- Heat-trapping greenhouse gases are now at record-high levels in the atmosphere compared to the recent and distant past.
- These high atmospheric levels are the clear result of human activity.
- Average global carbon dioxide concentrations have increased about 38 percent from pre-industrial levels to 2009, and almost all of this is due to human emissions.
- Atmospheric concentrations of the two most important, directly emitted, long-lived greenhouse gases—carbon dioxide and methane—are well above the natural range over at least the last 650,000 years.
- Projected atmospheric concentrations of the six greenhouse gases show an increase under all scenarios by 2030 compared to 2000.

The Climate is Warming

- Warming of the climate system is unequivocal, as evidenced by increases in:
 - Global average air and ocean temperatures
 - Widespread melting of snow and ice
 - Rising global average sea level
- Global surface temperatures have risen by 1.3 degrees Fahrenheit over the last 100 years.
- Eight of the 10 warmest years on record have occurred since 2001.

Human Greenhouse Gas Emissions are Causing Climate Change

- Most of the global warming of the last 50 years is very likely due to human-induced increases in greenhouse gas emissions.
- Multiple lines of evidence support this:
 - Our basic physical understanding of the climate system: greenhouse gas concentrations have increased and their warming properties are well-established.
 - Historical estimates of past climate changes suggest that the recent changes in global surface temperature are unusual.
 - Computer-based climate models are unable to replicate the observed warming unless human greenhouse gas emissions are included.
 - Natural forces alone (such as solar and volcanic activity) cannot explain the observed warming.

Climate Change is Projected to Continue During This Century

- Future warming during the 21st century—even with low emissions growth—is very likely to be larger than warming during the 20th century.
- The Intergovernmental Panel on Climate Change projects a temperature rise of between 3 and 7 degrees Fahrenheit by the end of the 21st century.
- Multiple datasets show essentially the same global warming trend over the past 100 years, with the steepest increase in warming in recent decades. The evidence of human-induced climate change goes beyond observed increases in average surface temperatures; it includes melting ice in the Arctic, melting glaciers around the world, increasing ocean temperatures, rising sea levels, acidification of the oceans due to excess carbon dioxide, changing precipitation patterns, and changing patterns of ecosystem and wildlife functions.