

## Major Greenhouse Gases Associated With Human Activities

Greenhouse gas	How it's produced	Average lifetime in the atmosphere	100-year global warming potential
<b>Carbon dioxide</b>	Emitted primarily through the burning of fossil fuels (oil, natural gas, and coal), solid waste, and trees and wood products. Changes in land use also play a role. Deforestation and soil degradation add carbon dioxide to the atmosphere, while forest regrowth takes it out of the atmosphere.	see below*	1
<b>Methane</b>	Emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and agricultural practices and from the anaerobic decay of organic waste in municipal solid waste landfills.	12 years	21
<b>Nitrous oxide</b>	Emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.	114 years	310
<b>Fluorinated gases</b>	A group of gases that includes hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, among other chemicals. These gases are emitted from a variety of industrial processes and commercial and household uses, and do not occur naturally. Sometimes used as substitutes for ozone-depleting substances such as chlorofluorocarbons (CFCs).	A few weeks to thousands of years	Varies (the highest is sulfur hexafluoride at 23,900)

**This table shows 100-year global warming potentials, which describe the effects that occur over a period of 100 years after a particular mass of a gas is emitted. EPA uses global warming potentials from the Intergovernmental Panel on Climate Change's (IPCC's) Second Assessment Report,<sup>1</sup> as countries have agreed to do under current international guidelines within the United Nations Framework Convention on Climate Change (UNFCCC). Lifetimes come from the IPCC's Fourth Assessment Report.<sup>2</sup>**

**\* Carbon dioxide's lifetime is poorly defined because the gas is not destroyed over time, but instead moves among different parts of the ocean-atmosphere-land system. Some of the excess carbon dioxide will be absorbed quickly (for example, by the ocean surface), but some will remain in the atmosphere for thousands of years, due in part to the very slow process by which carbon is transferred to ocean sediments.**