

What Are Green House Gases?

Let's dive in and educate ourselves so we can be more aware of our environmental impact!

What is their impact?

Green house gases cause a rise in the temperature of the Earth by trapping energy from the sun.

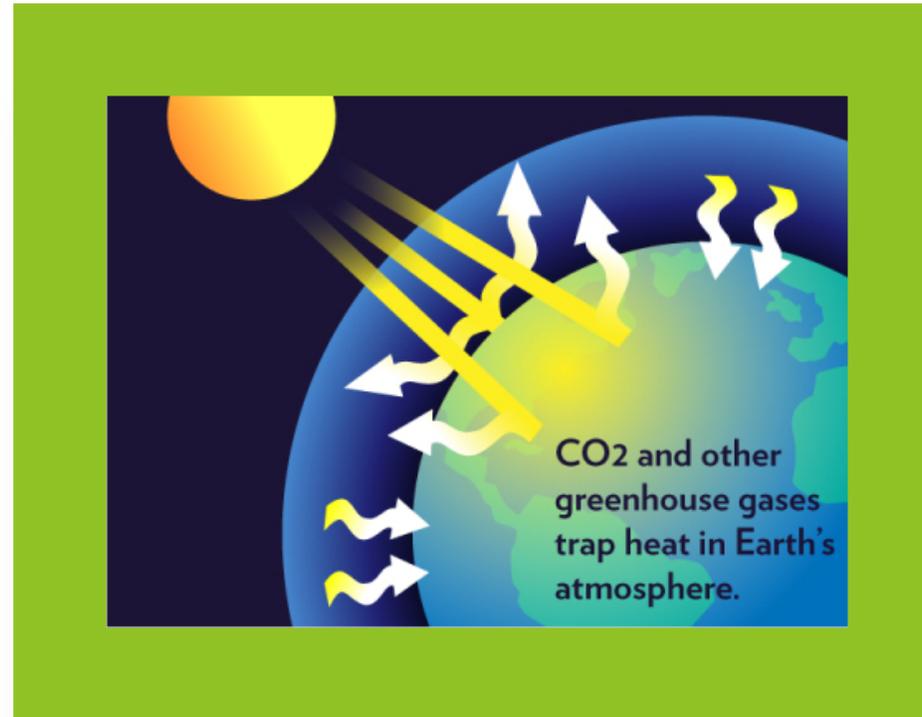


Photo of Earth Trapping heat by
<https://meteolcd.wordpress.com/2017/06/23/warming-by-greenhouse-gases-wrong-since-150-years/>

How do they do this?

Sunlight initially travels through greenhouse gases. The Earth absorbs the sunlight's energy and then sends it back into the atmosphere. Some of the energy passes back into space, while most of it stays trapped in the atmosphere by the greenhouse gases. This is what causes the rise in temperature.

Examples of Greenhouse Gases

- ▶ Carbon Dioxide: Released into the atmosphere from burning fossil fuels, trees, solid waste, and chemical reactions. Removed from the atmosphere by plants. Makes up 82% of Greenhouse Gases.
- ▶ Methane: Result of coal, natural gas, and oil production.
- ▶ Nitrous Oxide: Result of agricultural/industrial activity, fossil fuel/solid waste combustion, and wastewater treatment.
- ▶ Fluorinated Gases: Result of industrial activities, examples are hydrofluorocarbons, sulfur hexafluoride, nitrogen trifluoride, and perfluorocarbons.

U.S. Greenhouse Gas Pollution Includes:

9% Methane (CH₄)
Emitted during the production & transport of coal, natural gas & oil as well as from landfills.

6% Nitrous Oxide (N₂O)
Emitted during agricultural & industrial activities, as well as during combustion of fossil fuels & solid waste.

82% Carbon Dioxide (CO₂)
Enters the atmosphere through burning fossil fuels (coal, natural gas & oil), solid waste, trees & wood products & also as a result of certain chemical reactions (e.g., manufacture of cement).

3% Fluorinated Gases
Hydrofluorocarbons, perfluorocarbons & sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes.

**9%
Methane**

**6%
Nitrous
Oxide**

**82%
Carbon Dioxide**

**3%
Fluorinated
Gases**

**28%
Transportation**

**10%
Agriculture**

**20%
Industry**

**10%
Commercial
& Residential**

**32%
Electricity**

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2012

Source: EPA

<https://www.benjerry.com/values/issues-we-care-about/climate-justice/greenhouse-gases-101>

Carbon Cycle

- ▶ Carbon moves from the atmosphere to plants.
- ▶ Animals eat the plants containing carbon dioxide, so animals then contain the carbon dioxide.
- ▶ Carbon moves from plants and animals to soils. When plants and animals die, they decay and put the carbon in the ground.
- ▶ Carbon also moves from living things to the atmosphere. Plants and animals release carbon dioxide through respiration.
- ▶ Carbon also moves from fossil fuels to the atmosphere when they are burned. Fossil fuels are burned to power factories, power plants, and cars and trucks. When this happens a majority of the carbon directly enters the atmosphere as carbon dioxide gas. 3.3/5.5 billion tons of carbon that is released from burning fossil fuels a year stays in the atmosphere.

Experiment

- ▶ In this experiment you will enhance your understanding of green house gases with simple home supplies.
- ▶ You will need: 2 Jars, Water, Ice, Plastic Wrap, Thermometer
- ▶ Steps: First, fill two jars with an equal amount of ice and water. Put the lids back on the jars. Then, wrap only one of the jars in the plastic wrap, making sure it has several layers over it. Then, place the two jars outside in direct sunlight. After about 10 minutes, grab your thermometer and check each jar's temperature.
- ▶ Your results should show that the jar with the plastic wrap has a higher temperature. The plastic wrap represents green house gases and their trapping of sunlight.

Jars pictured source:
<https://sciencing.com/simple-models-global-warming-science-projects-20316.html>



Sources

- ▶ <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>
- ▶ http://www.all-science-fair-projects.com/print_project_1301_143
- ▶ <https://scied.ucar.edu/carbon-cycle>