



The greenhouse effect is a good thing - it warms the planet and makes life possible. Without it the world would be a frozen ball of ice.

The problem is, human activity is artificially increasing the natural greenhouse effect.

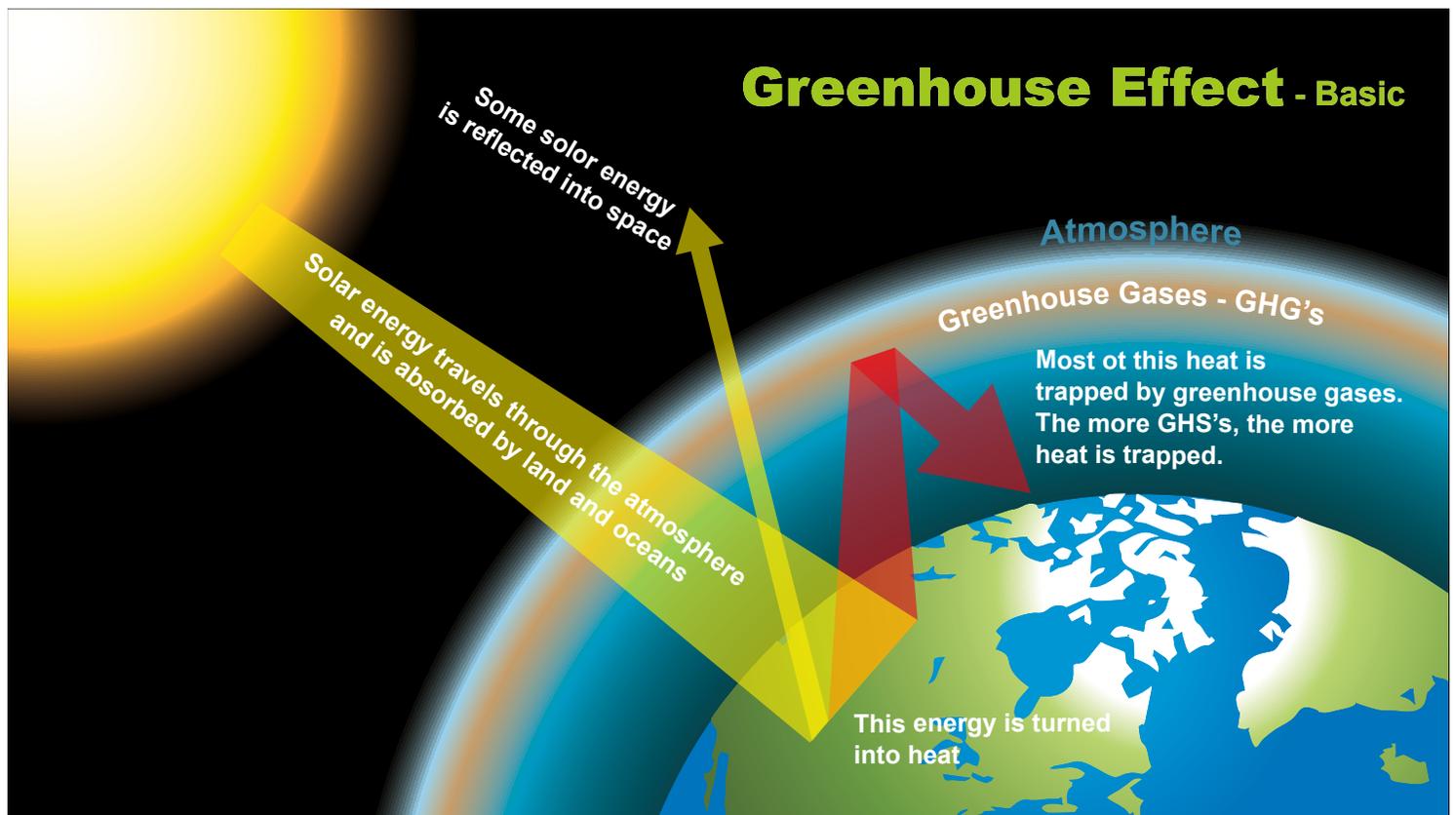
The result? An increase in global warming that is altering the planet's climate systems in countless ways.

What Is the Greenhouse Effect?

- The natural warming of the earth
- Caused when heat from the sun is trapped by certain gases (greenhouse gases) in the atmosphere - heat that would otherwise escape into space.

What Causes the Greenhouse Effect?

- Earth receives energy from the Sun - about 30 percent of the solar energy that reaches earth is reflected back to space
- Approximately 70 percent passes through the atmosphere to the earth's surface.
- This energy is absorbed by the land, oceans and atmosphere as heat
- This heat is then radiated back up into the atmosphere.
- Some of this energy continues on into space
- The majority of this energy(90 percent) gets absorbed by certain atmospheric gases, known as greenhouse gases (GHG's).
- The GHG's. trap this energy as heat which warms the Earth.
- Increasing the amount of these gases increases the amount heat so the Earth's temperature rises above normal.



Major Greenhouse Gases

Carbon Dioxide - 80%

- Sticks around for quite a while - 40 percent still remains after 100 years
- Produced by burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials and also as a result of certain chemical reactions (e.g., manufacture of cement).

Methane - 13%

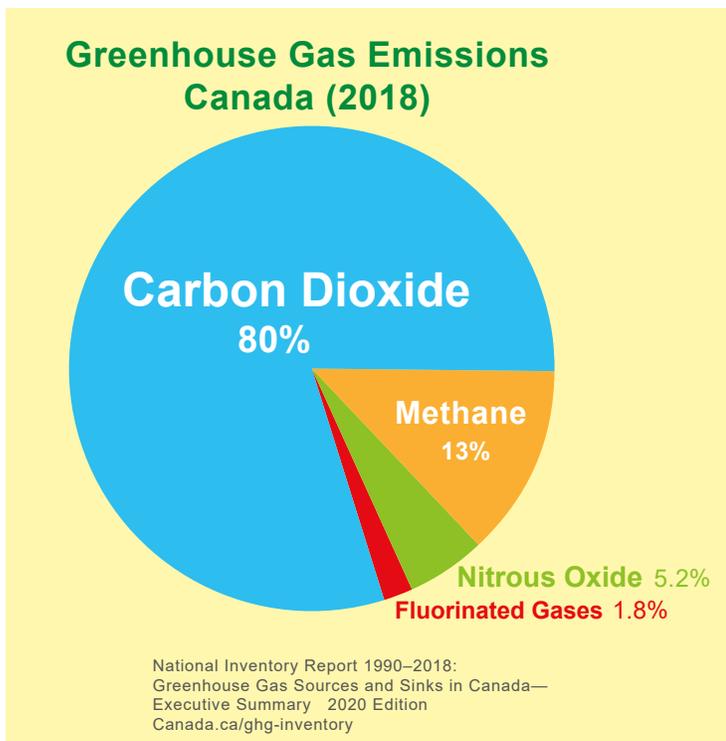
- Its global warming impact is 34 times greater than that of carbon dioxide.
- Emitted during;
 - production and transport of coal, natural gas, and oil.
 - digestive process of livestock and other agricultural practices.
 - decay of organic waste in municipal landfills.

Nitrous Oxide - 5.2%

- Powerful greenhouse gas: 300 times that of carbon dioxide
- Emitted during agricultural (use of nitrogen based fertilizers) and industrial activities, combustion of fossil fuels and solid waste, as well as during treatment of wastewater.

Fluorinated Gases - 1.8%

- Has long atmospheric lifetime - tens of thousands of years.
- Very powerful greenhouse gas: 23,000 times that of carbon dioxide
- The only synthetic (man-made) gas - it does not exist in nature
- Emitted from a variety of manufacturing and industrial processes including production of air conditioners and refrigerators.



The Human Impact

For most of the past 800,000 years (longer than human civilization) the concentration of greenhouse gases in our atmosphere have been fairly steady. Since the industrial revolution that concentration has jumped 40%, caused by human activities such as burning fossil fuels and deforestation. The majority of this rise occurred in the last 50 years.

The higher concentrations of greenhouse gases is causing extra heat to be trapped and global average temperatures to rise.

The enhanced greenhouse effect is leading to a significant changes in our climate - and accelerated global warming.

- There has always been variations in Earth's climate over the millennia but intense research has shown the current trends to be unlike any in the past and is caused by human impact.
- Warmer temperatures mean more energy in the atmosphere which will produce more violent and erratic weather patterns including storms, floods, heat waves, droughts, sever winters, etc.
- An enhanced greenhouse effect is warming the oceans and increasing the melting of glaciers and other ice sheets, which is causing the sea levels to rise and flooding of coastal areas.
- Higher temperatures and shifting climate patterns may change the areas where crops grow best and affect the makeup of natural plant and animal communities.

(See Fact Sheet on Climate Change for more details.)

More Information

The Greenhouse Effect - Environment Canada

<https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-effect.html>

Climate Change Information Kit - United Nations

<http://unfccc.int/resource/iuckit/cckit2001en.pdf> - United Nations Climate Change Information Kit (PDF Booklet)

Greenhouse Effect 101 - NRDC

<https://www.nrdc.org/stories/greenhouse-effect-101>

Earth's Energy Budget - NASA

<https://earthobservatory.nasa.gov/features/EnergyBalance>

Videos

What Does Climate Change Mean For Canada?

<https://www.youtube.com/watch?v=9SvIT6z5nhc> - 1 °C and its impacts: what does climate change mean for Canada?

State of the Climate 2018

<https://www.youtube.com/watch?v=6r5wKrC7p50> - State of the Climate 2018 - Updated version (February 2019)

Climate Change 101 with Bill Nye - National Geographic

<https://www.youtube.com/watch?v=EtW2rrLHs08> - Climate Change 101 with Bill Nye | National Geographic