

The Basics of Climate Change

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Weather vs. Climate

Weather:

Refers to the state of the atmosphere over several minutes to several days.

• Climate:

Refers to the long-term average of weather over long periods of time (decades.)

The Science

- Climate Change is HAPPENING!!!!
- It is caused large part by human activity.
- It will have many serious and potentially damaging effects in the decades ahead.
- Greenhouse Gas Emissions from cars, power plants and other man-made ARE the primary cause.
- These emissions include Carbon Dioxide — the main greenhouse gas — which has reached a concentration level in our atmosphere that the Earth hasn't seen for more than 400,000 years.

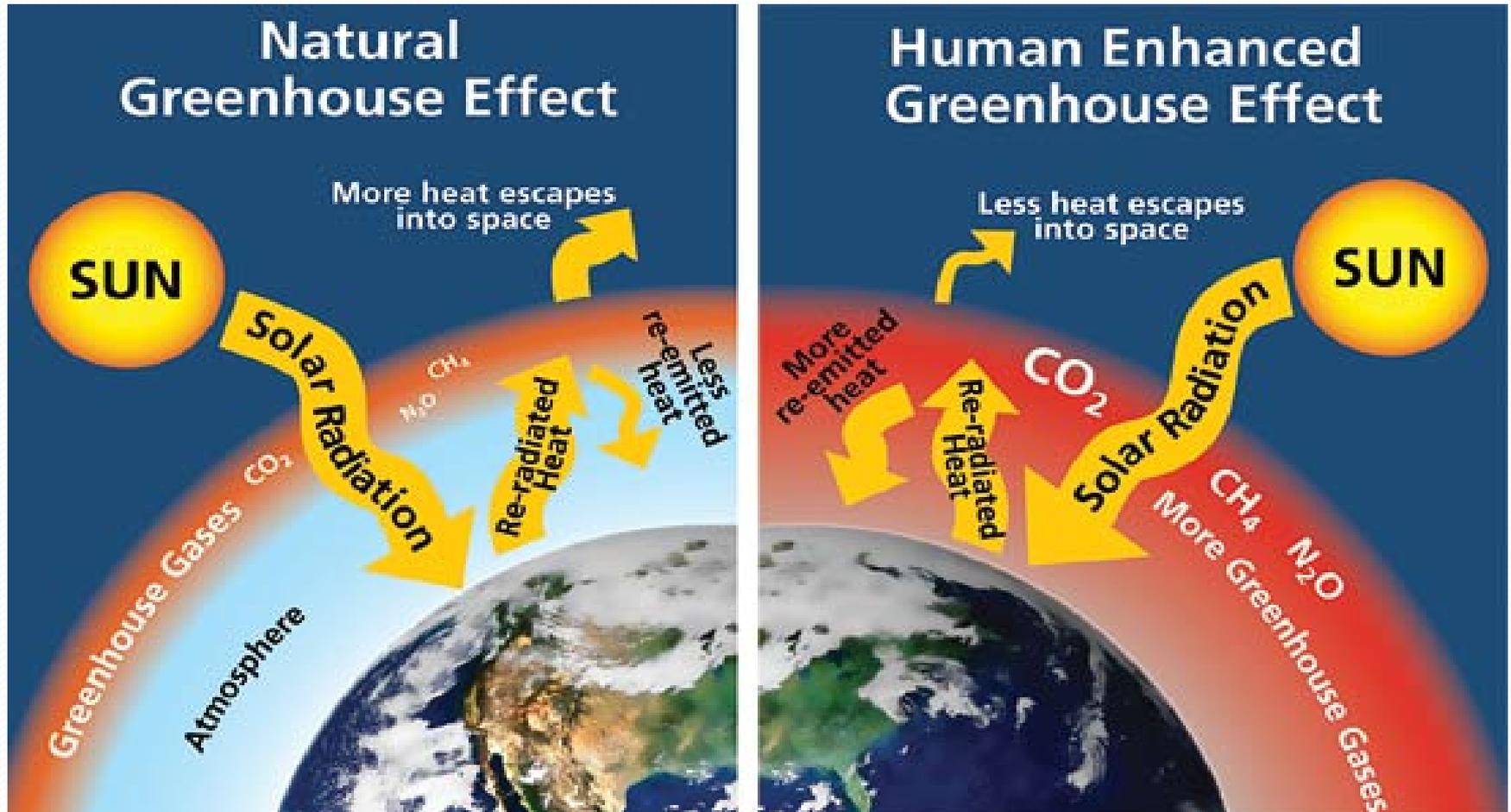
The Greenhouse Effect

- Up until about 150 years ago, human activity did not produce many greenhouse gases.
- That changed as forests were cleared to make way for cities and farms, and as important inventions and industrial innovations, like the widespread use of electricity and cars, transformed the way we live.
- These inventions and innovations demand energy. Burning fossil fuels — coal, oil, and natural gas — has become an important source of that energy.
- Burning fossil fuels releases carbon dioxide and other greenhouse gases into the atmosphere.

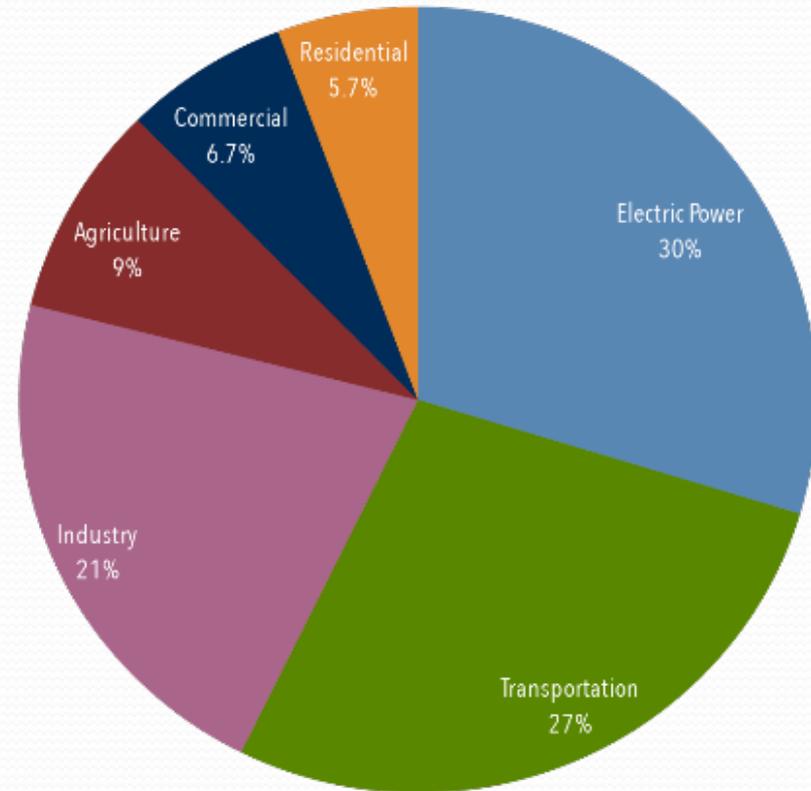
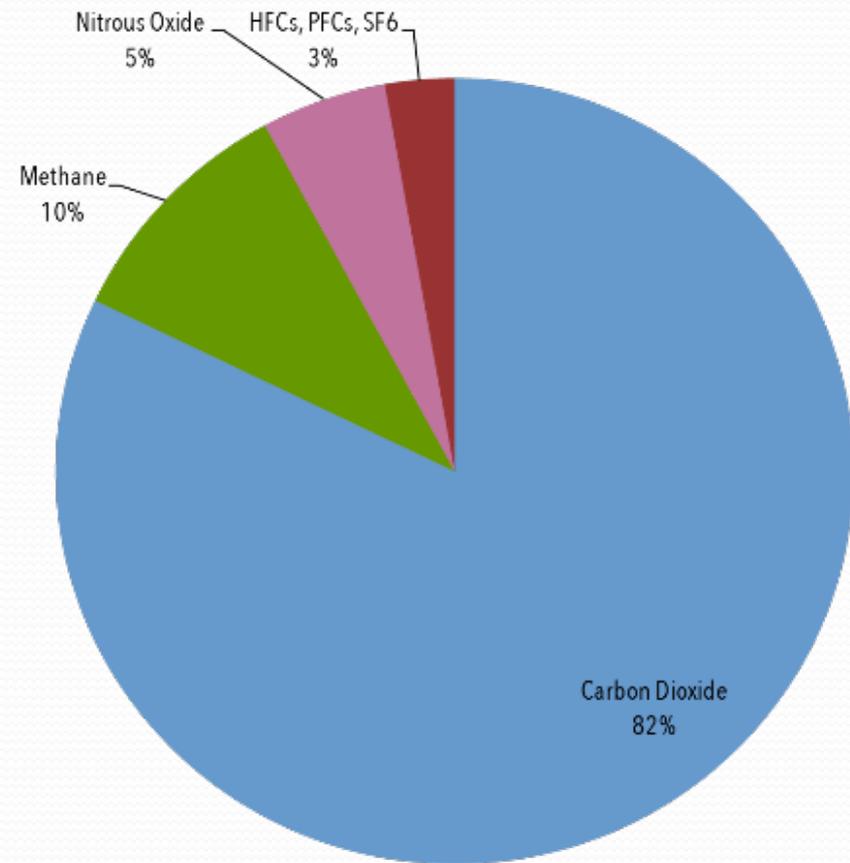
The Greenhouse Effect

- It is a natural process that warms the planet. But human activities are increasing the amount of greenhouse gases and trapping more heat.
- Most Common Types:
 - Carbon Dioxide (CO₂)
 - Burning of Fossil Fuels
 - Methane (CH₄)
 - Coal, Natural gas and Oil
 - Nitrous Oxide (N₂O)
 - Agricultural & Industrial Activities
- These greenhouse gases act like a blanket, trapping the sun's warmth near the earth's surface, and affecting the planet's climate system.
- Greenhouse gases stay in the atmosphere for a long time. Although plants and the ocean absorb carbon dioxide, they can't keep up with all the extra carbon dioxide that people have been releasing. So the amount of carbon dioxide in the atmosphere has been increasing over time.

The Greenhouse Effect



The Greenhouse Effect

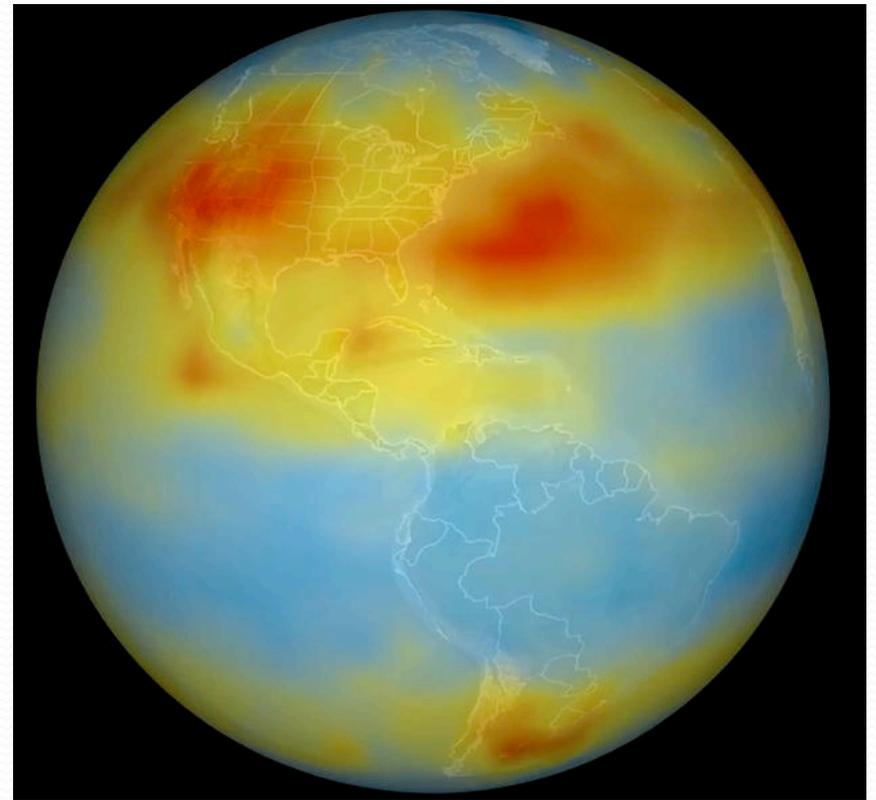


Impacts of Changing Climate

- Each of the past four decades has been warmer than the previous one. The five warmest years have all been since 2010 those include 2015, 2016 and 2017.
- Rising global temperatures threaten human health, increase the risk of some types of extreme weather, and damage ecosystems.
- As the oceans warm and polar ice caps melt, sea levels are rising, endangering coastal areas. These impacts are already being felt today.

Impacts of Climate Change

- **Heat Waves:** Heat waves are long periods of time with above-normal temperatures.
- As the Earth warms, more areas will be at risk for hotter and more frequent extreme heat waves.



Impacts of Climate Change



- **Sea-Level Rise:** Sea level has risen about 8 inches due to the melting of glaciers and ice sheets. The warming of seas and oceans is also making coastal storms more damaging.
- Scientists predict sea levels in the United States could rise 1 to 4 feet in the 21st century, and could be even higher if glaciers in Greenland or Antarctica melt especially quickly.

Impacts of Climate Change



Impacts of Climate Change

- **Threats to Habitats and Animals:** As temperatures warm, many plants and animals are migrating to higher elevations or away from the equator. Some animals may have difficulty moving or adapting to new habitats.
- **Wildfires:** These are large fires that burn vast amounts of forests and brush. When they are not controlled, wildfires can destroy homes and be deadly. The number of large wildfires and the length of the wildfire season have been increasing in recent decades

Impacts of Climate Change



- **Ocean Acidification:** Extra carbon dioxide in the atmosphere is absorbed by the oceans, making them more acidic. This can make it difficult for corals and microorganisms that form shells to survive, disrupting the food supply for other sea animals.

Impacts of Climate Change: Drought

- Recent U.S. droughts have been the most expansive in decades.
- Years: 2011, 2012, 2013 & 2018
- Warmer temperatures can amplify the impacts of drought.
- Increased temperatures enhance evaporation from soils, making periodic droughts worse than they would be under cooler conditions.
- Also, warmer temperatures can increase water demand and evaporation, stressing water supplies.

Impacts of Climate Change: Drought

- **Agriculture:** Droughts affect livestock and crops, including cornerstone commodities like corn, soybeans, and wheat. At the height of the 2012 drought, the U.S. Department of Agriculture declared a natural disaster over 71 percent of the United States.
- **Transportation:** Droughts can affect water levels on rivers of commerce like the Mississippi & Missouri Rivers. Transport barges need at least nine feet of water, and to maintain this level.
- **Energy:** Droughts can raise concerns about the reliability of electricity production from plants that require cooling water to maintain safe operations. Hydroelectric power may also become unavailable during droughts. When heat waves coincide with droughts, electricity demands can grow, compounding stress on the grid.

What We Can Do Now?

- Governments and businesses must identify their drought vulnerabilities and improve their resilience. Actions like using water more efficiently and developing more drought-resistant crops will help prepare for both future droughts and climate change.
- Other actions that improve resilience to other stressors, like deploying green infrastructure or increasing energy efficiency in buildings (thereby using less water-cooled power), can improve resilience to drought as a co-benefit.

What We Can Do Now?

- **Prepare for life in a changing climate.** We need to make sure our buildings, roads, businesses and all the services they use can withstand the climate changes that we can't avoid.
- **Reduce the greenhouse gas emissions responsible for climate change.** Tackling The Root: Pollution from Burning Fossil Fuels!
- By choosing cleaner or GREENER ways to power our homes, offices, cars, and being more efficient and less wasteful, we can produce fewer greenhouse gas emissions.

What We Can Do Now?

- Support environmental policies that matter, supporting renewable energy projects, and prioritizing fuel and energy efficiency will not only curb individual carbon emissions but bolster clean alternatives to dirty fossil fuels. We must all step up—and now.

Any
Questions
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