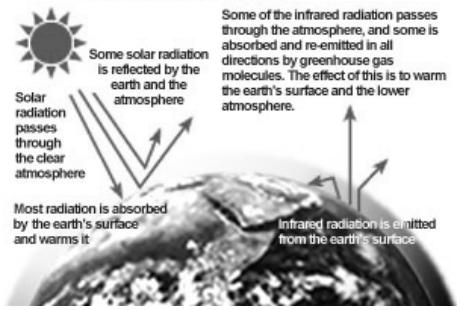
EGEE 102 – Energy Conservation And Environmental Protection

Global Warming

The Greenhouse Effect



Greenhouse Gases

- ***Carbon dioxide***
  - combustion of solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products
- ***Methane*** **:**
  - production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic wastes in municipal solid waste landfills, and the raising of livestock.
- ***Nitrous oxide***
  - agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels.
- ***hydrofluorocarbons*** **(HFCs),** ***perfluorocarbons*** **(PFCs), and** ***sulfur hexafluoride*** **(SF6),**
  - industrial processes

Source: http://www.epa.gov/globalwarming/emissions/index.html

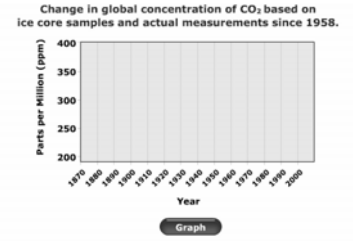
Global Warming

- **Excessive greenhouse gases in the atmosphere due to anthropogenic emissions retains more heat than normal causing the earth's temperature to raise.**
- **This excessive warming is GLOBAL WARMING.**

Global Warming Potential

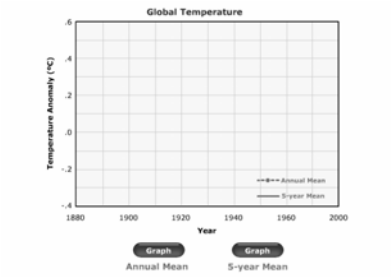
Gas	GWP
Carbon dioxide (CO2)	1
Methane (CH4)*	21
Nitrous oxide (N2O)	310
HFC-23	11,700
HFC-125	2,800
HFC-134a	1,300
HFC-143a	3,800
HFC-152a	140
HFC-227ea	2,900
HFC-236fa	6,300
HFC-4310mee	1,300
CF4	6,500
C2F6	9,200
C4F10	7,000
C6F14	7,400
SF6	23,900

CO2 Changes since Industrialization



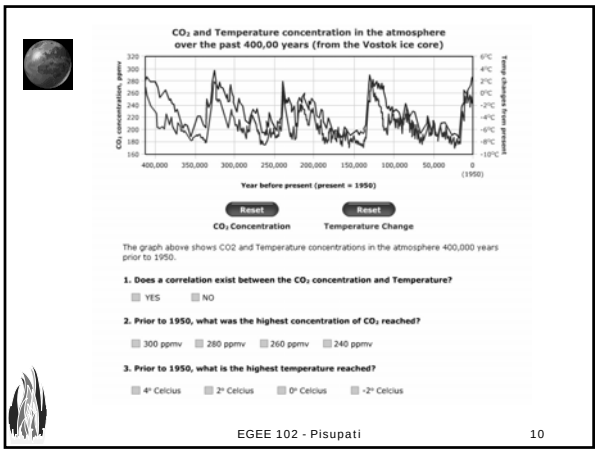
Greenhouse Effect

Temperature Changes

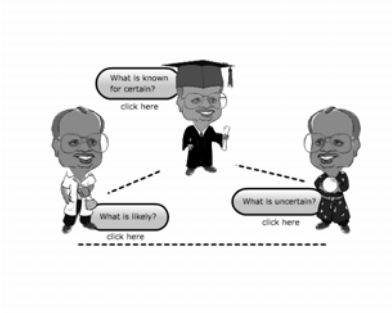


GHG Emissions Increase

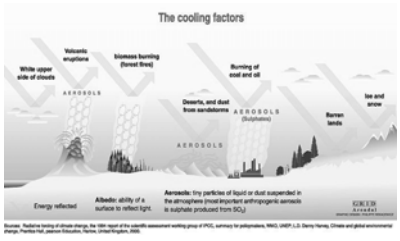
- **Since pre-industrial times atmospheric concentrations of CO_2, CH_4 and N_2O have climbed by over 31%, 151% and 17%, respectively. Scientists have confirmed this is primarily due to human activity. Burning coal, oil and gas, and cutting down forests are largely responsible.**



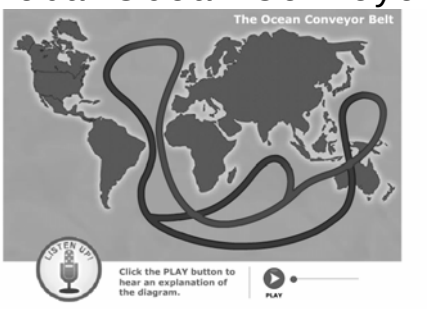
So what?



Uncertainties - Cooling Factors



Global Ocean Conveyor



Global Warming

- **Cut your utility bills by purchasing energy-efficient appliances, fixtures, and other home equipment and products. The average house is responsible for more air pollution and carbon dioxide emissions than is the average car.**

Individual Emissions

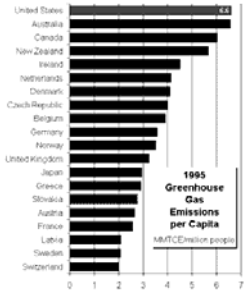
- **In the United States, approximately 6.6 tons (almost 15,000 pounds carbon equivalent) of greenhouse gases are emitted per person every year. And emissions per person have increased about 3.4% between 1990 and 1997. Most of these emissions, about 82%, are from burning fossil fuels to generate electricity and power our cars.**

Effects

- Health
- Water resources
- Polar regions
- Mountains
- Forests
- Rangelands
- Deserts
- Coastal Zones
- Agriculture
- International

Required Reading:
http://www.epa.gov/globalwarming/impacts/index.html

Greenhouse Gas Emisions



Solution

Energy Efficiency
Means
Doing the Same
~ or More ~
With Less Energy.

Required Reading:
http://www.epa.gov/globalwarming/actions/index.html

Class Videos

- **The fallacy of Global Warming**
- **Changing Climates: The Impact.**

Required Additional Reading

- **http://www.epa.gov/globalwarming/climate/index.html**
- **http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsIndividual.html**
- **http://www.giss.nasa.gov/edu/gwdebate/**