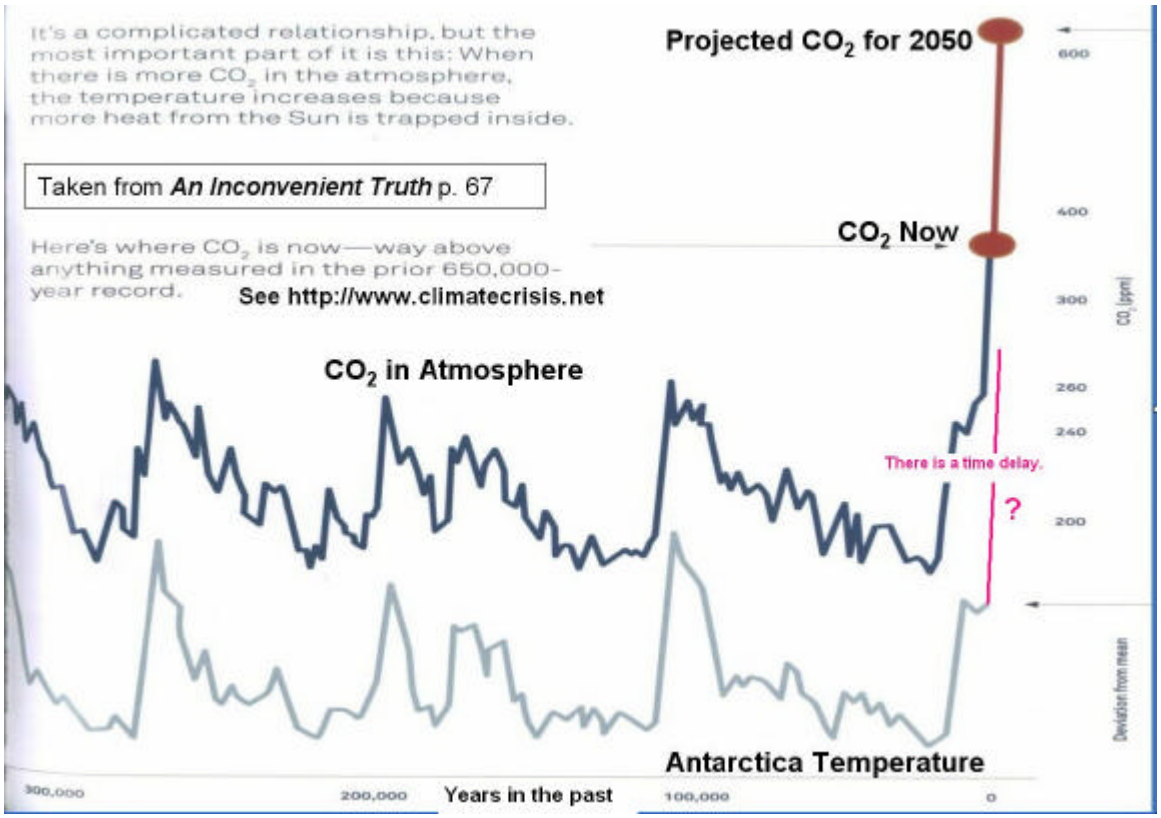
Carbon-Dioxide Emissions



There is mutual positive feedback between carbon dioxide in the atmosphere and Earth temperature.

- 40% from fossil fuels burned to generate electricity.
- 33% from vehicle exhausts.
- 12% from energy for buildings.

Mitigation of Global Warming

- Reduce energy use at home: Insulation, efficient heating and cooling, efficient lighting.
- Use public transportation.
- Buy locally.
- Buy renewable energy credits (a.k.a. green tags) to offset carbon emissions. (http://www.green-e.org, http://en.wikipedia.org/wiki/Green_tags)
- Buy hybrid vehicles (baby step), then plug-in hybrid vehicles (juvenile step), then biofueled plug-in vehicles (mature step). Buy electric vehicles for short trips.
- Plant trees (three for every one that dies) (http://www.seedtree.org)

References:

- ***An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It*** by Al Gore.
- ***Heat: How to Stop the Planet From Burning*** by George Monbiot.
- ***Climate Change Begins at Home: Life on the Two-Way Street of Global Warming*** by Dave Reay.
- ***Plug-In Hybrids: The Cars that will Recharge America*** by Sherry Boschert.

Carbon-Dioxide Emissions Inventory

Do the following calculation for each vehicle driven:

$$\frac{\_\_\_\_\_ \frac{\text{miles}}{\text{year}}}{\_\_\_\_\_ \frac{\text{miles}}{\text{gallon}}} \times \begin{bmatrix} 19.4 \frac{\text{lbs of } CO_2}{\text{gallon}} \text{ if gasoline} \\ 22.2 \frac{\text{lbs of } CO_2}{\text{gallon}} \text{ if diesel} \end{bmatrix} = \_\_\_\_\_ \frac{\text{lbs of } CO_2}{\text{year}} \xrightarrow{\text{divide by 2000}} \_\_\_\_\_ \frac{\text{tons of } CO_2}{\text{year}}$$

Electricity used:

$$\_\_\_\_\_ \frac{\text{kiloWattHours}}{\text{month}} \times 12 \frac{\text{months}}{\text{year}} \times 2.25 \frac{\text{lbs of } CO_2}{\text{kWh}} = \_\_\_\_\_ \frac{\text{lbs of } CO_2}{\text{year}} \xrightarrow{\text{divide by 2000}} \_\_\_\_\_ \frac{\text{tons of } CO_2}{\text{year}}$$

(This assumes coal is used to generate electricity, as it is for Blacksburg. The factor for natural gas is 1.14. For general U.S. use about 1.75 for the factor.)

Natural gas used:

$$\_\_\_\_\_ \frac{\text{ThousandCubicFeet}}{\text{month}} \times 12 \frac{\text{months}}{\text{year}} \times 121 \frac{\text{lbs of } CO_2}{\text{tcf}} = \_\_\_\_\_ \frac{\text{lbs of } CO_2}{\text{year}} \xrightarrow{\text{divide by 2000}} \_\_\_\_\_ \frac{\text{tons of } CO_2}{\text{year}}$$

Heating oil used:

$$\_\_\_\_\_ \frac{\text{gallons}}{\text{month}} \times 12 \frac{\text{months}}{\text{year}} \times 22.5 \frac{\text{lbs of } CO_2}{\text{gallon}} = \_\_\_\_\_ \frac{\text{lbs of } CO_2}{\text{year}} \xrightarrow{\text{divide by 2000}} \_\_\_\_\_ \frac{\text{tons of } CO_2}{\text{year}}$$

Do the following calculation for each person that flew by airlines:

$$\_\_\_\_\_ \frac{\text{miles}}{\text{year}} \times 0.70 \frac{\text{lbs of } CO_2}{\text{mile}} = \_\_\_\_\_ \frac{\text{lbs of } CO_2}{\text{year}} \xrightarrow{\text{divide by 2000}} \_\_\_\_\_ \frac{\text{tons of } CO_2}{\text{year}}$$

Total:

Vehicles total:	_____ tons/year
Electricity:	_____ tons/year
Natural gas:	_____ tons/year
Heating oil:	_____ tons/year
Flying total:	_____ tons/year
TOTAL:	_____ **tons/year**

You may want to do this by the month instead of by the year to try to reduce it each month.

You may want to offset the carbon dioxide you put into the atmosphere by supporting renewable-energy production by buying renewable energy credits (a.k.a. green tags) (http://www.green-e.org, http://en.wikipedia.org/wiki/Green_tags).
You could start by just offsetting the electricity used for the first year and then, for each succeeding year, add another offset for one of the other items.
Download a spreadsheet for doing the inventory calculation given above:
http://www.roperld.com/science/CarbonDioxideEmissionsPersonal.xls

Global Warming may be one of the greatest challenges that has confronted humans in the last 10,000 years.

Two basic principles of Global Warming mitigation are:

1. Use fossil carbon for making useful recyclable materials, not for burning as fuel.
2. Increase the ratio of vegetative mass to human mass.

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