Watch Your Step! Calculate Your Carbon Footprint

Susan Powers
Clarkson University
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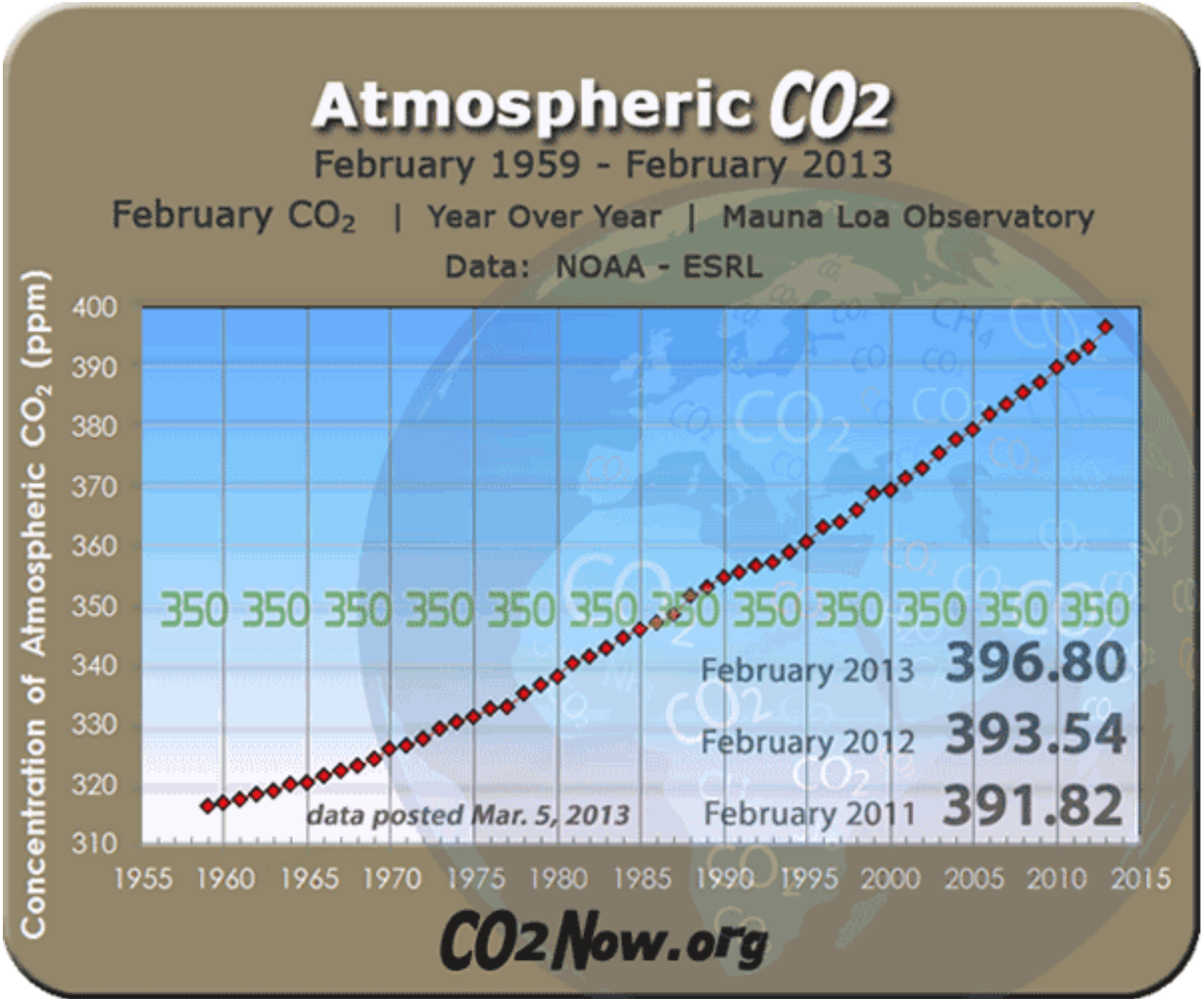
Today's Learning Objectives

By the end of tonight's session, you will:

- Understand the anthropogenic sources of carbon dioxide
  - Generally – Nation, State
  - In your own lives
- Identify the specific activities that contribute most to your own greenhouse gas emissions
- Identify actions that you can take to reduce your own Carbon Footprint


Atmospheric CO2
February 1959 - February 2013
February CO_2 | Year Over Year | Mauna Loa Observatory
Data: NOAA - ESRL
Concentration of Atmospheric CO_2 (ppm)
400
390
380
370
360
350
340
330
320
310
350 350 350 350 350 350 350 350 350 350 350 350
February 2013 396.80
February 2012 393.54
February 2011 391.82
data posted Mar. 5, 2013
1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015
CO2Now.org

From co2now.org

Where humanity's CO2 comes from

91% 33.4 billion metric tonnes

Fossil Fuels & Cement 2010

9% 3.3 billion metric tonnes

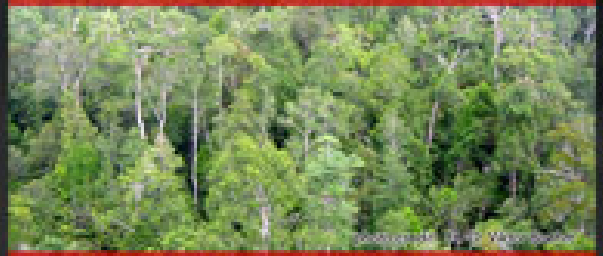
Land Use Change 2010

Where humanity's CO2 goes

50% 18.4 billion metric tonnes

Atmosphere 2010

26% 9.5 billion metric tonnes

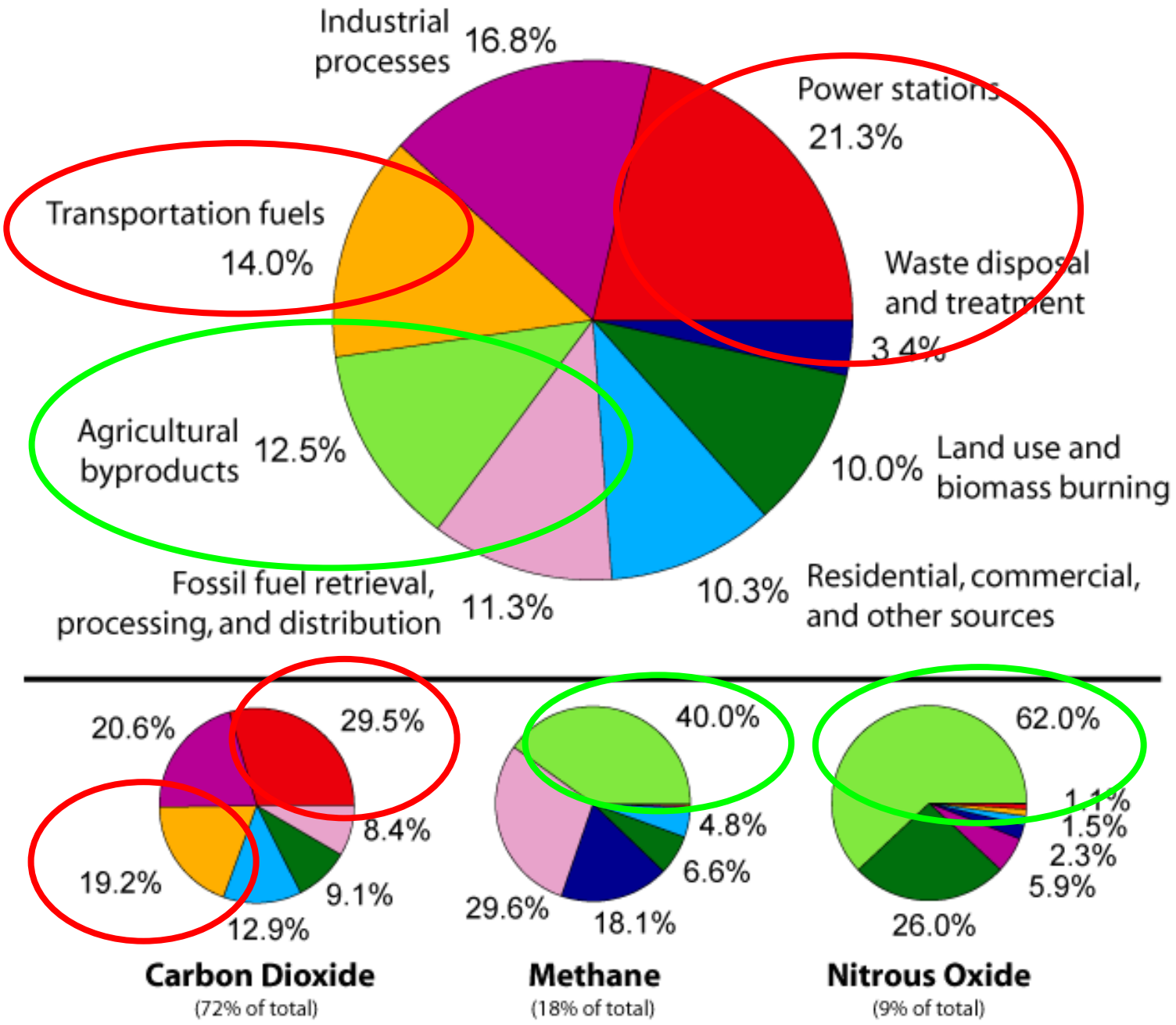


Land 2010

24% 8.8 billion metric tonnes

Oceans 2010

Annual Greenhouse Gas Emissions by Sector



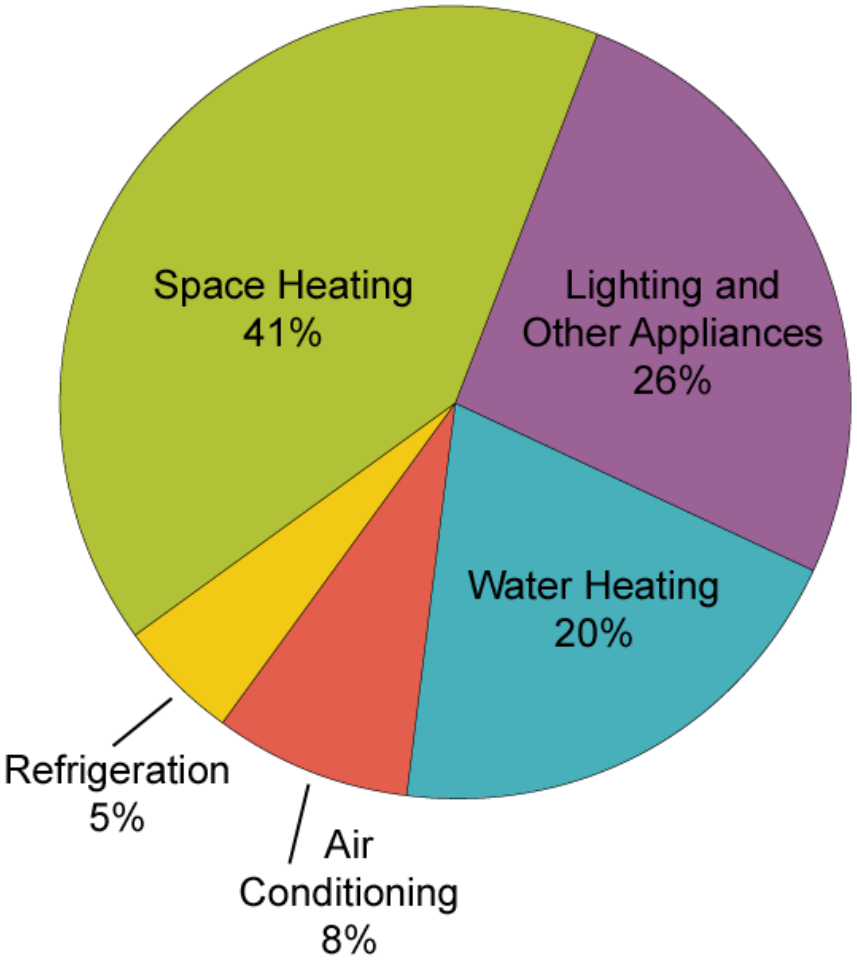
USA

How do you use energy?

- Your life –
  - How do you use energy?
    - Rank order the energy use by highest to lowest amount.
  - How do you use electricity?

READ: U.S. DOE Energy Perspectives
http://www.eia.gov/emeu/aer/pdf/perspectives_2009.pdf
Energy Explained
http://www.eia.gov/energyexplained/index.cfm

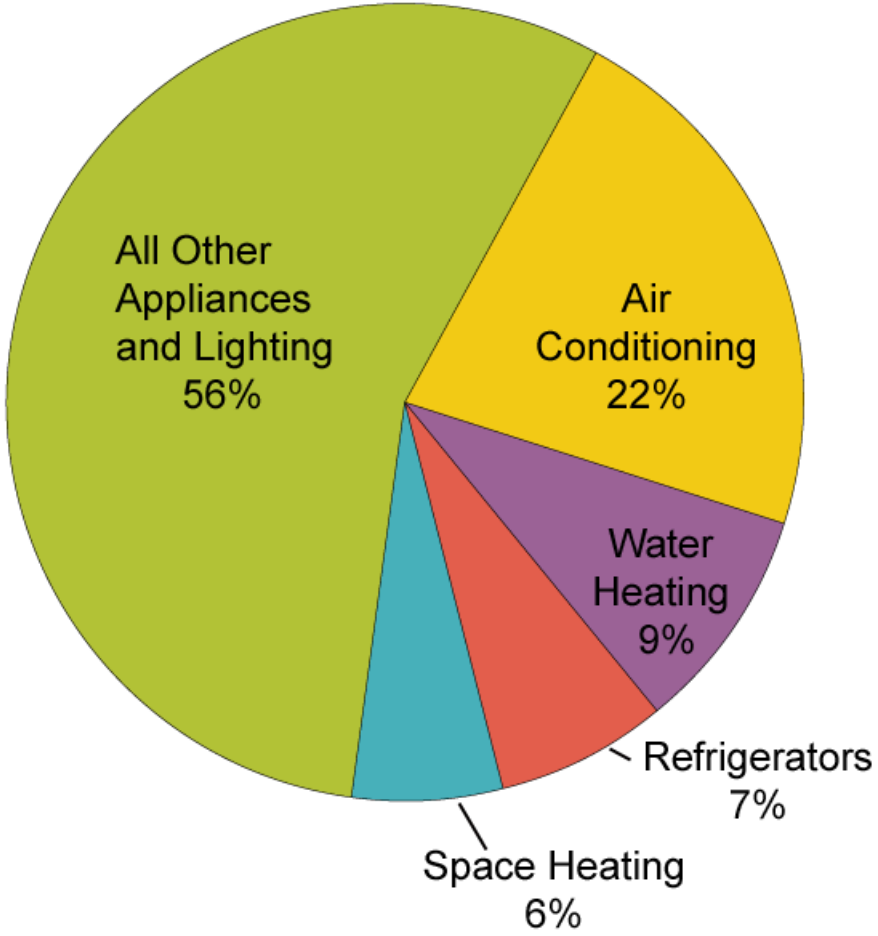
How Energy Is Used in Homes (2005)*



* 2005 is the most recent year for which data are available.

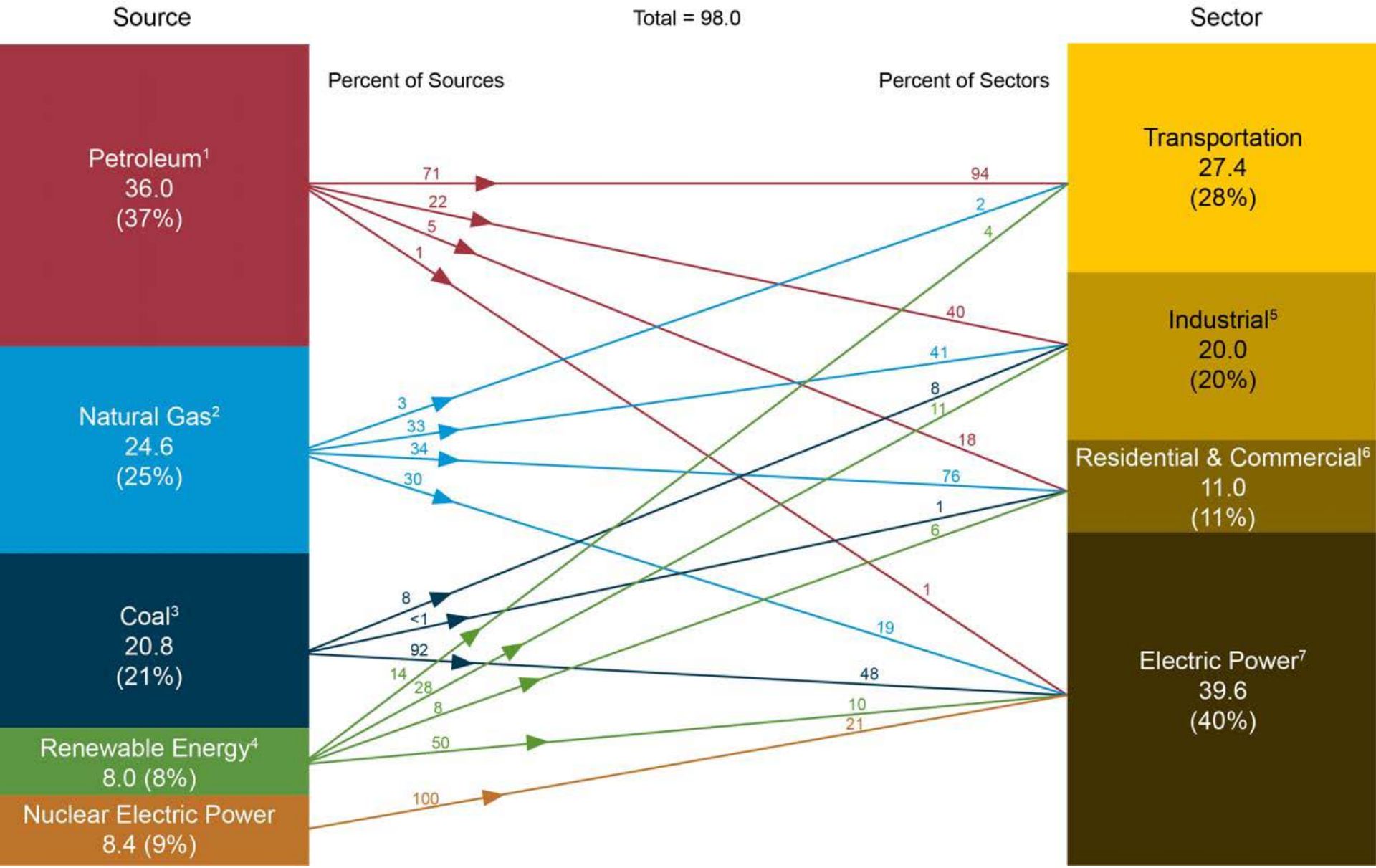
Source: U.S. Energy Information Administration, *Residential Energy Consumption Survey 2005*.

How Electricity Is Used in Homes,



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2011,* Table 4, Reference Case. Projections based on the Residential Energy Consumption Survey 2005.

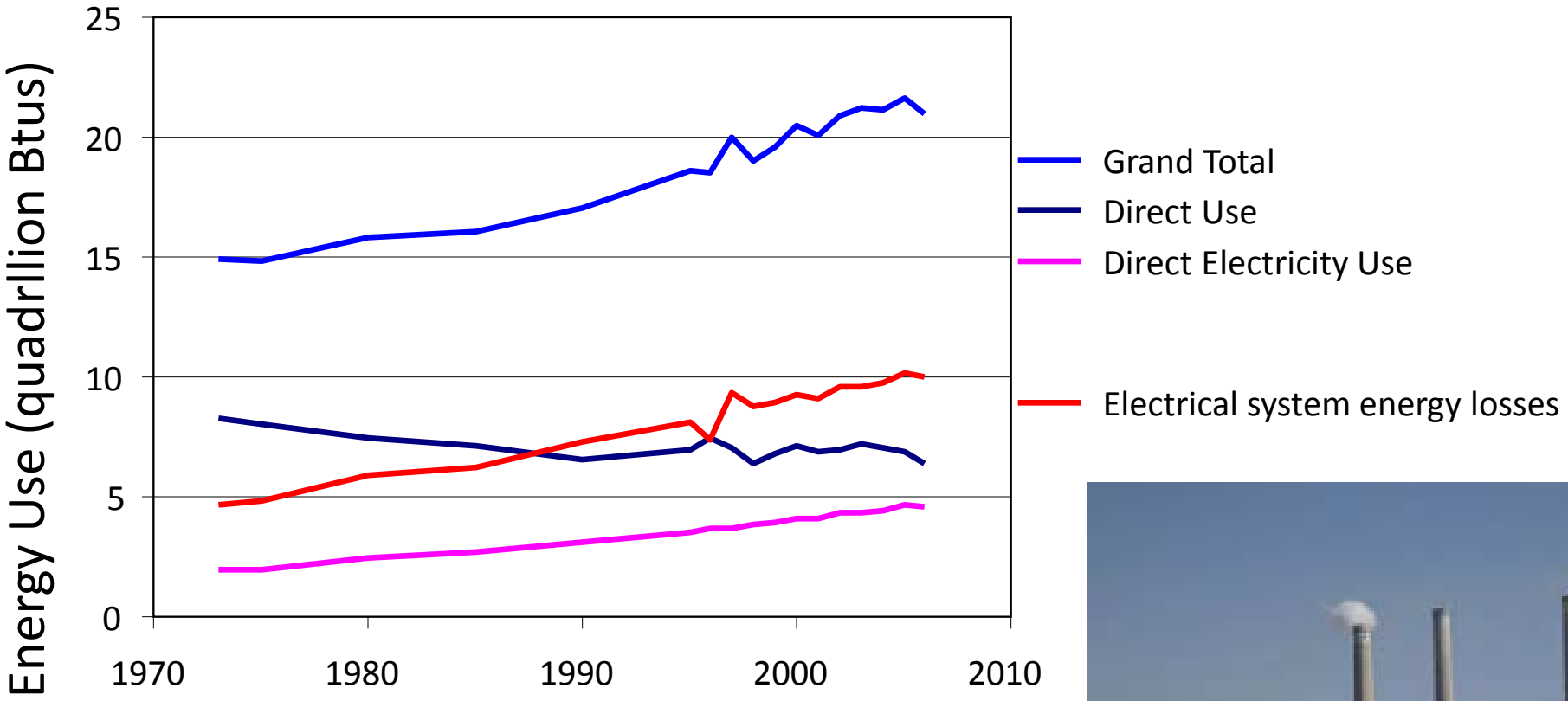
Electricity is 42% of home energy use



http://www.eia.gov/totalenergy/data/annual/index.cfm#consumption

Background on Electricity

U.S. Total Residential Energy Use



Source: Energy Information Administration/Monthly Energy Review December 2007; www.eia.doe.gov

We use coal as electricity…

- **Electricity Is a Secondary Energy Source**
- Coal → electricity → home = very inefficient

Coal mining, processing transport

80% efficient

Coal combustion & electricity generation

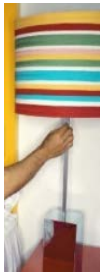
35% efficient

Transmission & distribution

90% efficient

CFL

10% efficient



Do you turn off the lights?

??% efficient

100 MJ coal energy

→ 2.5 MJ Light energy

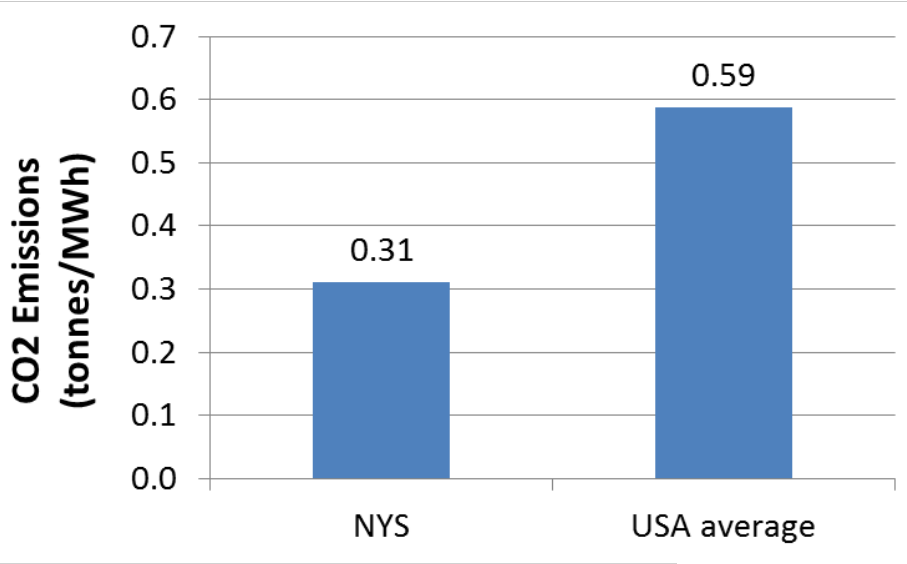
Energy Efficiency of power plants:

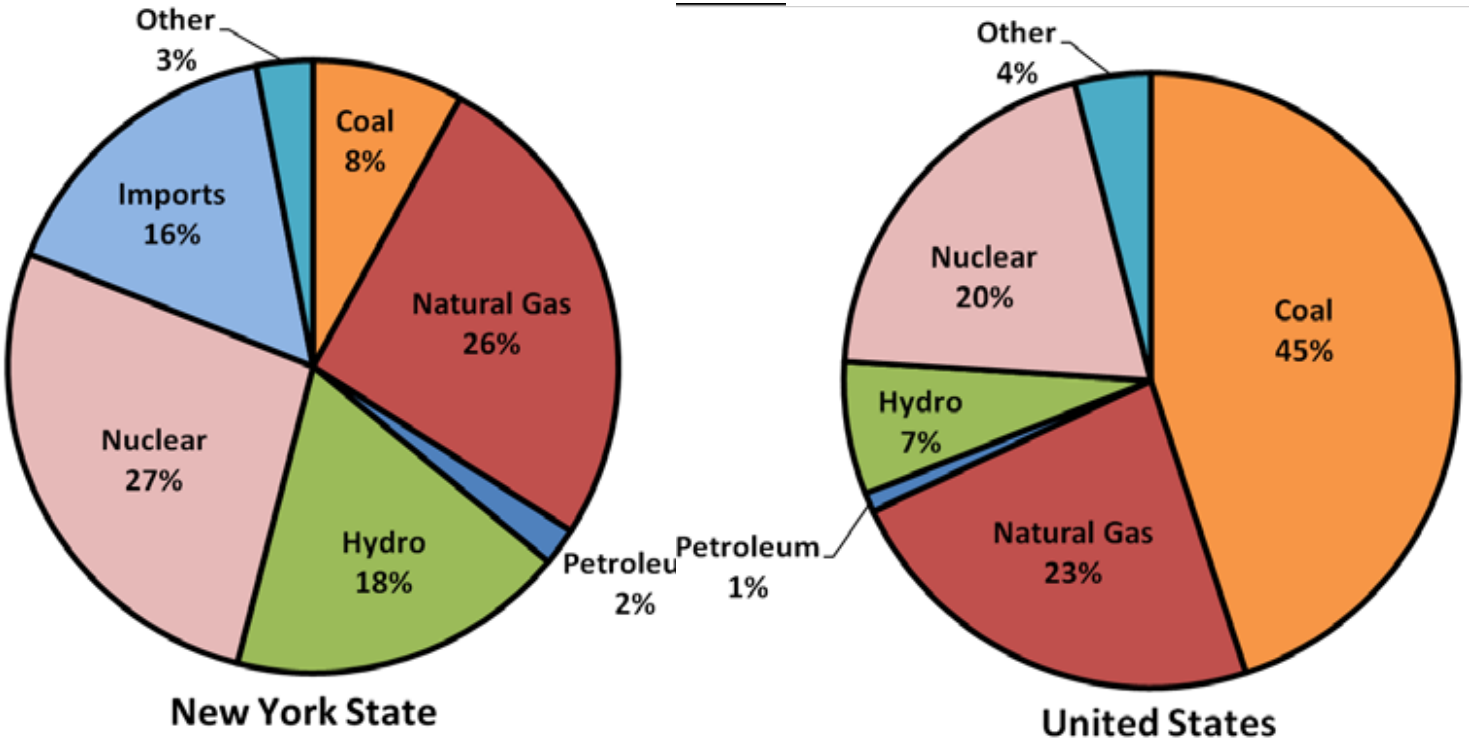
Coal	30-46%
NG	33-53%
Residual Oil	35%
Biomass	32-40%

Example – GHGs from Electricity

- Questions:
  - How much GHGs do you generate with electricity use?
  - Does it matter where you live?
  - Explain Why or Why not
  - What can you conclude about New York State?
- Procedure:
  - Explore fuels used and resulting CO_2 emissions
  - http://epa.gov/powerprofiler

Your home town (or school)			
East Hampton NY	11937	Chicago IL	60601
Boston MA	02129	Kansas City MO	64101
Seattle WA	98101	Atlanta GA	30301
Los Angeles CA	90001	Denver CO	80012
Columbus OH	43201	Honolulu HI	96801





2009 U.S. and New York State electric power generation by fuel
http://www.nyserda.org/publications/1995_2009_patterns_trends_rpt.pdf

But how does that contribute to your Greenhouse gas emissions?

Personal Emissions Calculator

- Ecological Footprint Calculator
  - No data required
  - Presents results as # Earths it would take for world's population to live like you
  - Identifies specific sources of impact and possible changes
  - http://www.earthday.org/footprint-calculator

- Carbon Footprint
  - detailed, lots of data required
  - www.carbonfootprint.com/calculator.aspx

- EPA Personal Emissions Calculator
  - Requires data for home energy use, vehicle miles driven, fuel economy
    - (no diet or consumption questions)
  - Good assessment of potential savings if make changes
  - http://www.epa.gov/climatechange/ghgemissions/ind-calculator.html

- Nature Conservancy
  - Easy, based on general behavior
  - Not very accurate
  - http://www.nature.org/initiatives/climatechange/calculator/

My household

- Electricity 2729 kWh/y
- Natural Gas 590 therms
- Honda Fit 11,762 miles; 36.5 mpg
- Ford Escort 1,889 miles; 25 mpg
- Generally materials conservative lifestyle

Carbon Footprint Calculator

Language: English (United States)

Why create an account?

Welcome | House | Flights | Car | Motorbike | Bus & Rail | Secondary | Results

Your Carbon Footprint:

☑ House	1.06 metric tons of CO_2
☑ Flights	1.50 metric tons of CO_2
☑ Car	3.49 metric tons of CO_2
☑ Motorbike	0.00 metric tons of CO_2
☑ Bus & Rail	0.00 metric tons of CO_2
☑ Secondary	3.14 metric tons of CO_2

Total = 9.19 metric tons of CO_2

House 12%
(75% heating)

Secondary 34%

Flights 16%

Car 38%

...fset some or all of your carbon footprint, click the sections you would like to offset in the list above, and click the Offset Now button.

Total To Offset = 9.19 metric tons of CO_2 Offset Now

- Your footprint is 9.19 metric tons per year
- The average footprint for people in United States is 20.40 metric tons
- The average for the industrial nations is about 11 metric tons
- The average worldwide carbon footprint is about 4 metric tons
- The worldwide target to combat climate change is 2 metric tons

Sensitivity of Results

- Excessively consumptive and wasteful lifestyle
  - Secondary emissions 3.14 to 17.5 metric tons CO_2
- Even more conservative lifestyle
  (vegan, no car, no plane, no waste, only local, organic food)
  - Secondary emissions to 0 metric tons CO_2
  - Total to 1.1 mt/y CO_2 (household)
- Drive 10% less, 50 mpg auto
  - Total to 7.5 mt/y CO_2

Saving 1 Metric ton CO_2

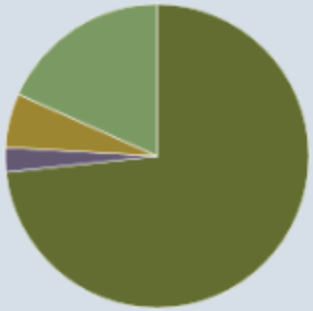
- Recycling 0.32 tons of waste instead of sending it to the landfill
- Carbon sequestered by 23 tree seedlings grown for 10 years
- Not using 102 gallons of gasoline

http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results

Get Started | Home Energy | Driving & Flying | Food & Diet | Recycling & Waste | Results

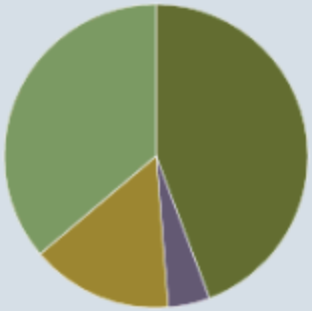
Your Results

Your Behavior Breakdown



- Home Energy (18.4%)
- Driving & Flying (73.3%)
- Recycling & Waste (2.8%)
- Food & Diet (5.6%)

U.S. Average Behavior Breakdown



- Home Energy (36.8%)
- Driving & Flying (43.5%)
- Recycling & Waste (4.4%)
- Food & Diet (15.3%)

Your estimated greenhouse gas emissions are **19 tons** of carbon dioxide (CO_2) equivalent per year, which is **below the U.S. national average.**

To reduce your climate impact

Carbon Footprint Calculator

Total Greenhouse Gas Emissions:

19 Tons of CO_2 eq/year

U.S. Average per Person:

27 Tons of CO_2 eq/year

You can *reduce* your carbon footprint:

17	x$15	=$255
Your Estimated Emissions	Cost per Metric Ton	Your Recommended Offset

Offset Your Footprint >

Offset your carbon footprint with The Nature Conservancy, you'll help support projects that protect forests, improve forest management, or plant trees. Your tax-deductible gift* will make a difference for our lives, our environment and future generations.

Learn More »
Offset your Emissions »
Offset a Portion of Your Emissions »

Offset with a Monthly Gift >

You can make a monthly commitment toward reducing your overall climate impact. You can choose to offset your emissions for the current year or give any amount you want. You have complete control and can manage your monthly gift at anytime online. Plus, it's paperless!

Learn More »
Offset with a Monthly Gift »

Learn About Offsets >

With the rise in awareness and concern about the effects of climate change, voluntary carbon offset programs have begun to proliferate around the world. Learn more about The Nature Conservancy's Carbon Offset Program.

Program FAQ's »
What to Look For »
Meeting High Standards »

Nature Conservancy

$ USD

Clean Energy Portfolio ($ 11.22 per tonne)
Your funding supports carbon reduction projects around the world which reduce carbon emissions through the displacement of fossil fuels through clean / renewable energy generation.

Reforestation in Kenya ($ 14.43 per tonne)
Your pledge funds the planting of native broad leaved trees in the Great Rift Valley, Kenya.

UK Tree Planting ($ 21.64 per tonne)
Your pledge funds the planting of trees in the UK region of your choice. Supporting wildlife habitats whilst offsetting your carbon emissions.

Americas Portfolio ($ 14.43 per tonne)
Your pledged funds will be used in our American Maya Nut Tree program in Guatemala, Nicaragua, El Salvador, Honduras, and Mexico.

Personal Climate Action Plan

- Is there room in your lifestyle to make changes in your personal (or household) GHG emissions?
- What 3 steps will you take?
- What can you do to encourage others to change their behaviors?