

Activity 5.2: Group C Buildings Handout

In the United States, approximately four metric tons of carbon dioxide (CO₂) equivalent (almost 9,000 pounds) per person per year (about 17% of total U.S. emissions) are emitted from people's homes. The three main sources of these emissions from homes are electricity, heating, and waste.

- Using **electricity** produces carbon emissions because power plants burn fossil fuels to make the electricity you use in your house.
- Using **heat** produces carbon emissions if you heat your house by burning wood (carbon is emitted from your chimney during wood combustion), if you heat your house with natural gas (carbon is emitted from your furnace during gas combustion), and if you heat your house with electricity (carbon is emitted at the power plant during fossil fuel combustion).
- Producing **waste** creates carbon emissions when your garbage is sent to the landfill, and when the products you throw away are made.

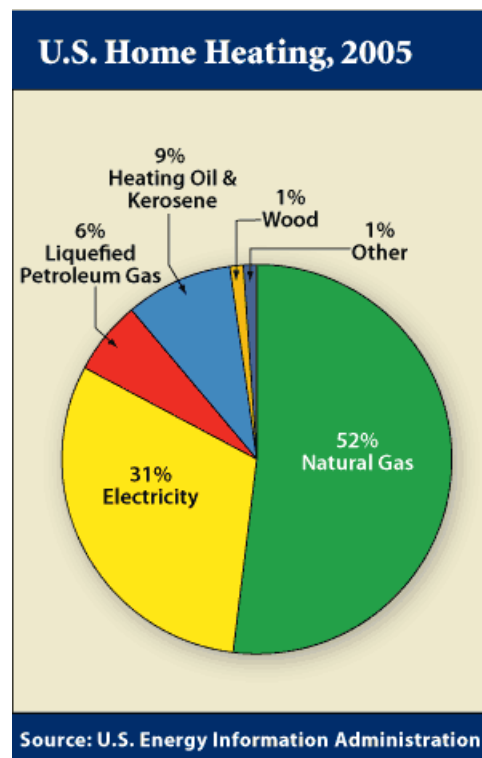
Electricity Use

Homeowners use electricity for lighting, operating appliances, producing hot water and in some cases heating and cooling. When coal and other fossil fuels are burned to produce electricity, carbon dioxide is emitted into the atmosphere. The average household CO₂ emissions from electricity are approximately 7.4 metric tons per year (about 16,290 pounds). Different power plants use different types of fuel, and a power plant that runs on coal emits more greenhouse gases per unit of electricity than a power plant that uses natural gas. Solar panels and wind turbines do not produce greenhouse gases.

Home Heating

Both heating and cooling your home require large amounts of energy - more than we use for other appliances. Unless you live in a very hot climate, you most likely consume more energy heating your home than cooling it.

During the winter, many people rely on furnaces to heat their homes. Most furnaces burn fossil fuels such as heating oil or natural gas. When these fossil fuels are burned they release carbon dioxide, which is vented to the outside by a chimney or exhaust system. The burning (combustion) of fossil fuels transforms chemical energy into heat energy for the home. Air is heated and is then circulated through ducts around the home. The amount of carbon dioxide emissions can vary by fuel, furnace efficiency, and the temperature setting in the home. Some furnaces called “boilers” transfer heat energy to water or steam instead of to air.



In colder climates, heating can account for up to two-thirds of a home's annual energy bill. On average, heating an American home with natural gas produces about 6,400 pounds of carbon dioxide a year. In cold places like Minnesota, homes can emit about 8,000 pounds of CO₂ for natural gas heat and 9,900 pounds for electric heat.

In hot parts of the country, air conditioners are bigger carbon dioxide emitters. A typical Florida home with central air conditioning, for instance, produces about 6,600 pounds of CO₂ per year. You can reduce emissions in your home by adjusting your thermostat. For example, when cooling your home, you can save 120 pounds of CO₂ emissions every year for every degree above 72°F you set your thermostat. That means if you set your thermostat to 75°F, you can save 360 pounds of CO₂.

Waste

Most people don't realize that the trash they throw away leads to emissions of greenhouse gases. Each pound of trash you throw away will emit approximately 0.94 pounds of carbon dioxide equivalent in the form of methane, and the average person in the U.S. throws away over 1,130 pounds of waste per year. For every person in the U.S., about 1,060 pounds of CO₂ equivalent comes from garbage we throw out every year.



The goods we throw away require energy to create, but by recycling some of those goods we can save energy and minimize emissions. In most cases it takes more energy to create a new product than it takes to produce something from recycled material. By recycling more we can reduce the waste we send to landfills and reduce greenhouse gas emissions. The average recycling rate for the United States is 30.6%. If the recycling rate increased to 35%, we could lower our greenhouse gas emissions by 67 pounds of CO₂ equivalent per person!

As trash decomposes in landfills, it produces gases like methane, the primary component of natural gas, and CO₂. These gases are produced during the decomposition of organic material (like leftover food, paper, and grass clippings) contained in municipal solid waste landfills. Most landfill gas goes into the atmosphere, but at some landfills it is captured and used as a source of energy to convert to electricity or heat. By using the gas to produce energy, landfills can reduce their emissions of methane, and reduce the need to generate energy from fossil fuels. These projects help businesses and communities protect the environment and build a sustainable future.