

# ENERGY HOG C H A L L E N G E



## STUDENT GUIDE

NAME: \_\_\_\_\_

Energy Hog Campaign ♦ [WWW.energyhog.org](http://WWW.energyhog.org)

In cooperation with the NEED Project

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Explore the world of energy! Take the Energy Hog Challenge and discover what it means to be an Energy Hog Buster. Find out where you get energy, how you use energy and why it's so important to save energy.

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# Energy Hog Challenge

## GLOSSARY

**Biomass** — organic material that has stored sunlight in the form of chemical energy. Biomass fuels include wood, straw, manure, and many other byproducts from agricultural processes.

**Coal** — a fossil fuel formed by the breakdown of vegetable material trapped underground without access to air.

**Electricity** — the flow of electrical power. We produce power by converting other sources of energy, like coal, natural gas, oil, or uranium into electricity. Typically, anything plugged into a wall (like a toaster or the TV) uses electricity to run.

**Energy** — the ability to do work or the ability to move an object.

**ENERGY STAR®** — a trustworthy label on things like home appliances and computers to show that these products use less energy and save money compared to similar products.

**Fossil Fuels** — materials that were formed from ancient plant and animal life that were compressed underground over millions of years. Examples are coal, oil and natural gas.

**Fuel** — any material that can be used as an energy source.

**Hydropower** — the energy of moving water. A **Hydroelectric Power Plant** uses moving water to power a turbine generator to produce electricity.

**Insulation** — material that helps keep your home cool in the summer and warm in the winter because it resists the flow of heat. Glass fiber is one example of insulation. It should be found in places like behind your walls, underneath your floor and in the attic.

**Nonrenewable** — fuels that cannot be made (or renewed) in a short period of time. When we use them all up, we can't make more. Nonrenewable fuels include oil, natural gas, and coal.

**Natural Gas** — an odorless, colorless, tasteless, clean-burning fossil fuel. It is usually found in fossil fuel deposits.

**Oil** — raw material from which petroleum products are made.

**Power** — the rate at which energy is transferred. Electrical energy is usually measured in watts.

**Programmable Thermostat** — a thermostat that controls a household's heat or air conditioning temperature. It can be used to keep the temperature lower (70° or lower) in the winter and higher (80° or higher) in the summer while you are sleeping or out of the house.

**Renewable** — fuels with limitless quantities or that can be used over and over again and will never run out. Renewable fuels include solar, wind, hydropower, biomass, and geothermal energy.

**Solar** — the radiant energy of the sun, which can be converted into other forms of energy, such as heat and electricity.

**Turbine** — a device for converting the flow of a fluid (air, steam, water, or hot gases) into mechanical motion. Turbines can be connected to generators that convert the motion of the turbine into electricity.

**Wind** — the term given to any natural movement of air in the atmosphere. It is a renewable source of energy used to turn turbines to generate electricity.

# Unit One: Energy at Home

## Energy History

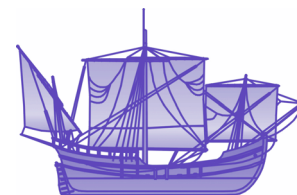


A long time ago, the Native Americans (Indians) used **biomass** for energy. Biomass is anything that was alive a short time ago, like plants and animals. They burned wood (biomass) to cook food and warm their homes. Sometimes, they burned dried animal dung (biomass).

The sun gave them light in the day. Their fires and the moon and stars gave them some lights at night.

Some Indians lived in tents made of animal skins, called teepees. Others lived in rock and mud homes or in caves. Some of the caves were deep in the earth. These caves were warm in the winter. Heat from inside the earth—**geothermal energy**—kept them warm.

Then new people, known as the early settlers, arrived in America. They traveled on boats with sails. The sails captured the energy in the **wind** and pushed their boats to the New World.

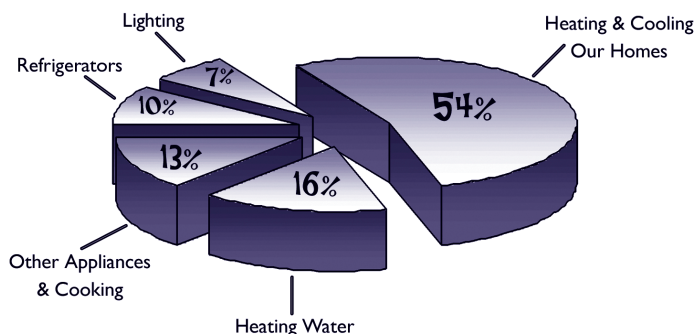


The settlers built houses out of wood—**biomass**. They burned wood to keep warm and cook their food. They had no fans or air conditioners to keep them cool in hot weather. The settlers didn't have light bulbs back then, so they made candles from animal fat to see in the dark. Most settlers rose at dawn and went to bed when the sun went down.

The settlers used water wheels to capture the energy in moving water—**hydropower**. They were able to run sawmills to cut wood by using hydropower.

As the nation grew and became more industrialized, people learned to use different energy sources, such as coal, oil, and natural gas to make heat and electricity. Electricity changed people's lives. For the first time they could use light bulbs to see at night. Later, scientists learned that uranium from inside the earth could be used to make **nuclear energy** by splitting atoms. Today, many different sources of energy are used to make electricity. We use electricity because it is a safe, easy way of using energy.

## How Do We Use Energy?



We need energy to live. Think about what you did from the moment you woke up today until now. You probably used energy to turn on the lights, heat your shower water, listen to music on the radio, or cook your breakfast.

You use energy in the winter to heat your home, and energy in the summer to cool

your home. Think about how much heat people in Alaska need to stay warm in the winter! Think about how much air conditioning people living in Florida need to stay cool in the summer!

The more energy you use, the more it costs. Energy bills show how much energy you use every month and how much money your family pays for that energy.

It takes a lot of energy to heat and cool our homes, and to heat water. Look at the pie chart to see how the average home in the United States uses energy.

# Unit One: Energy at Home

## Looking For the Energy Hogs in Your Home

The more energy you use at home, the more money you pay. An Energy Hog is anything that wastes a lot of energy, like an old refrigerator running in the garage or basement. If your family uses a lot of energy, you might have Energy Hogs in your home! An Energy Hog might also be a drafty window that lets cold air sneak in, or an attic that doesn't have enough insulation. There may be other things in your home that use energy all day long. Did you know that even when you are not using the DVD player and VCR, their little bright clocks still use energy? You can help your family save energy by learning about Energy Hogs and how you can bust them. When you save energy at home, your energy bills are lower, and this helps your family save money.

At home, this means doing things like turning off lights and appliances when you are not using them, and taking shorter showers. This also means setting the thermostat at 70 degrees Fahrenheit or lower during the colder seasons when you want to heat your home and setting it at 80 degrees Fahrenheit or higher in the warmer seasons when you want to cool your home. Using a programmable thermostat makes this job easy. You can also use energy-saving compact fluorescent light bulbs (CFLs) instead of the "old-fashioned" incandescent light bulbs. Your family can caulk or weatherstrip around windows to stop air leaks. Your home should have plenty of insulation in the walls and in the attic. Your family can replace old, worn-out appliances with energy efficient ones that have the ENERGY STAR® label on them.

Remember, watching out for the Energy Hogs in your home is easy and fun when you're energy smart. Saving energy will save your family money and help the environment too!



## Where Do We Get Energy?

Before we can use energy in our homes, we need to get it from somewhere. So where do we get energy? Some is found underground and some is found above ground. There are two main categories of energy sources: nonrenewable and renewable.



**NONRENEWABLE:** Coal, oil, natural gas, and uranium are found underneath the ground. Coal, oil, and natural gas came from dead plants and animals that lived a long time ago, and decayed under pressure deep inside the earth. They take millions of years to form. We can dig them up or put a long pipe into the ground to remove them. We call these sources of energy nonrenewable because once we use them they are gone forever. In the United States, 92 percent of our energy comes from nonrenewable energy sources.

# Unit One: Energy at Home

**RENEWABLE:** Scientists have figured out ways to make energy from moving water (hydropower), the sun (solar power), the wind (wind power), and plants (biomass). We call these sources of energy renewable because we will never run out of sunshine, moving water, wind, or plants. The sun gives off energy that travels to the earth as light with a range of wavelengths. Long wavelengths turn into heat when they touch the earth. By using technology like solar panels, we can capture the energy from the sun and turn it into electricity. Wind turbines capture the energy in the blowing wind. Dams are used to get energy from moving water. You can feel the heat energy coming out of wood when it is burned. In the United States, 8 percent of our energy comes from renewable energy sources.

Some energy sources change the environment more than others. Coal and oil, for example, can pollute the air when they are burned. Wind turbines do not pollute. Some energy sources cost more than others. Some renewable energy sources can cost more money. For example, solar panels are very expensive, even though sunshine is free.

By: Zach Levinson



Can you find the seven sources of energy?  
Label each one!

# Activity One: Energy HOG Scavenger Hunt

**Homework:** Do the Energy Hog Scavenger Hunt with your family and find out if you have Energy Hogs lurking in your home. Check the box that best applies to you and your home (*there are no wrong answers, so be honest*).

Heating & Cooling =  
54% OF YOUR energy bill!

**1. Attic Insulation:** Ask an adult at home how much insulation you have in the attic.

- 6 inches or less (2 points)
- 7 to 11 inches (4 points)
- 12 inches or more (6 points)

**2. Furnace Filters:** Ask an adult at home how often your filters were cleaned or changed in the last year.

- Not at all (2 points)
- 1 - 3 times (4 points)
- 4 or more (6 points)

**3. Windows:** How many layers of glass do your windows have?

- Single-pane with no storm windows (2 points)
- Single-pane with storm windows or double-pane (4 points)
- Double-pane with reflective coating or gas-filled (6 points)

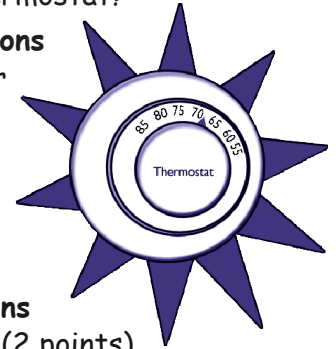
**4. Thermostat:** At what temperature do you set your thermostat?

**In heating seasons**

- 74° or higher (2 points)
- 71° - 73° (4 points)
- 70° or lower (6 points)

**In cooling seasons**

- 74° or lower (2 points)
- 75° - 77° (4 points)
- 78° or higher (6 points)



**5. Weatherstripping:** Open your front or back door and check the condition of the weatherstripping between the door and the doorframe.

- None (2 points)
- Worn out (4 points)
- Good condition (6 points)



Lighting, Cooking & Appliances =  
20% OF YOUR energy bill!

**6. Lights:** How often do you turn lights off when you leave a room?

- Almost Never (2 points)
- Sometimes (4 points)
- Always (6 points)

**7. Light Bulbs:** Count the number of compact fluorescent light bulbs (CFLs) you have in your house.

- No CFL bulbs (2 points)
- 1 - 4 CFL bulbs (4 points)
- 5 or more CFLs (6 points)



**9. Electricity:** Search your house for the ENERGY STAR® symbol. (hint: check things that are plugged in like the dishwasher, TV, etc.) How many did you find?

- No ENERGY STAR® labels found (2 points)
- 1 - 2 ENERGY STAR® labels found (4 points)
- 3 or more ENERGY STAR® labels found (6 points)

**8. Cooking:** How often does your family keep the lids on pots and pans when cooking dinner?

- Almost never (2 points)
- Sometimes (4 points)
- Always (6 points)

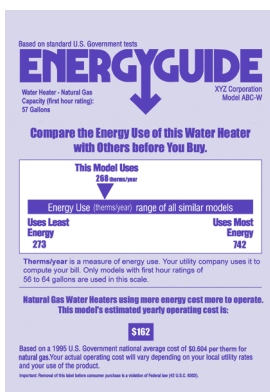


# Activity One: Energy HOG Scavenger Hunt

Heating Water =  
16% OF your energy bill!

**10. Water Heater:** Locate the Energy Guide label to determine your water heater's energy-efficiency rating. How much energy does it use compared to similar models?

- Uses the most energy (2 points)
- Uses an average amount of energy (4 points)
- Uses the least energy (6 points)



Refrigerator =  
10% OF your energy bill!

**11. Fridge Test:** Close the refrigerator door over a dollar bill or piece of paper so that it is half in and half out of the door. Then gently tug on it. How easy was it to pull out the dollar bill or piece of paper?

- Easy to pull (2 points)
- Hard to pull (4 points)
- Can't pull (6 points)

## How Did You Score?

Your Total Points →

(Add all of your points from the Scavenger Hunt to get your total.)

**52-66 AWESOME!!** You're doing a great job of busting those Energy Hogs in your house. Keep up the good work!

**37-51 ALMOST!** You're on your way to becoming an Energy Hog Buster, but there's still work to be done. Those Hogs might be creeping into areas of your house like your attic, and maybe around your windows. Think "Insulation!" and stop those Hogs from bringing you down. To stop them from sneaking through drafty windows, add caulking or weatherstripping.

**22-36 OINK! OH NOOO!** Taking the Energy Hog Scavenger Hunt is the first step, so good job! The next step is to bust the Energy Hogs that lurk in your home. They live in places that need insulation (like behind your walls and in the attic). And watch out, Energy Hogs will gobble up tons of energy through an old furnace. In the winter, use less heat in your home by wearing warmer clothes. During hot summer days, close the shades and use less air conditioning.



# Activity TWO: BUSTING THE ENERGY BILL

**Activity:** Help the Swine family understand how they use energy by graphing their energy use. Then, on a separate sheet of paper, make recommendations on how to lower their energy bill for each of the four categories: heating and cooling; cooking, appliances and lighting; water heating; and the refrigerator. Hint: For percentages of the total energy bill, see the Energy Hog Scavenger Hunt.

The Swine family saved their monthly energy bills for a whole year. According to their bills for the last 12 months, they spent \$1,650 on energy for that year. How much did it cost them to:

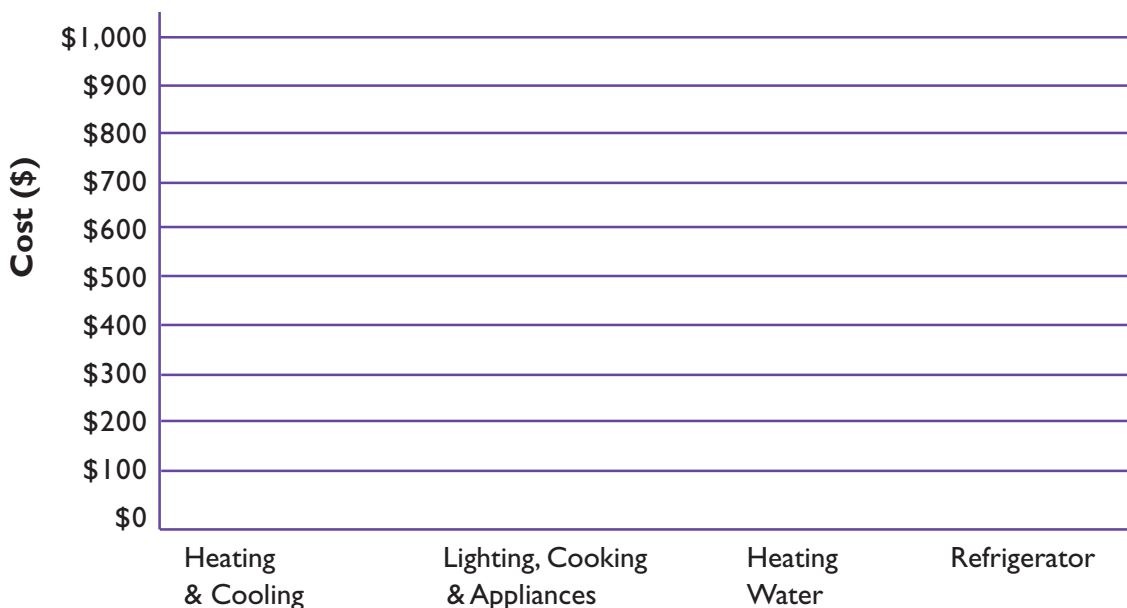
1) Heat and cool their home?  $\frac{\text{_____}}{\text{Total Energy Bill}} \times \frac{\text{_____}}{\% \text{ of Heating \& Cooling}} = \frac{\text{_____}}{\text{Total Cost of Heating \& Cooling}}$

2) Cook, run appliances, and light their home?  $\frac{\text{_____}}{\text{Total Energy Bill}} \times \frac{\text{_____}}{\% \text{ of Lighting, Cooking \& Appliances}} = \frac{\text{_____}}{\text{Total Cost of Lighting, Cooking \& Appliances}}$

3) Heat their water?  $\frac{\text{_____}}{\text{Total Energy Bill}} \times \frac{\text{_____}}{\% \text{ of Heating Water}} = \frac{\text{_____}}{\text{Total Cost of Heating Water}}$

4) Run their refrigerator?  $\frac{\text{_____}}{\text{Total Energy Bill}} \times \frac{\text{_____}}{\% \text{ of the Refrigerator}} = \frac{\text{_____}}{\text{Total Cost of the Refrigerator}}$

Create a bar graph below showing the cost of each energy task.

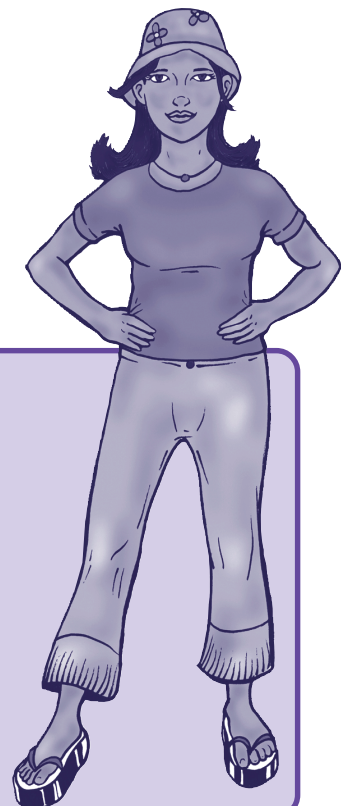


# ENERGY HOG BUSTER PLEDGE



*On this day, \_\_\_\_\_,*

My family and I pledge to bust Energy Hogs and save energy in our home by...



**OUR SIGNATURES:**

A large, empty rectangular box with rounded corners, intended for signatures.

# Unit Two: Energy Hog Media Center

Go to [www.energyhog.org](http://www.energyhog.org) and play five fun games to become an Official Energy Hog Buster like I did!!

What is your favorite game? What did you learn from the website? Did you check out the handbook? Take notes; they'll help you with the activity that your teacher will assign to you!



# The Energy Hog Challenge is Supported By:



Energy Outreach Colorado



## National Fuel Funds Network

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Wyoming Business Council

*Tracy Locke and the Ebeling Group/Lobo are responsible for the creation and production of the Energy Hog.*