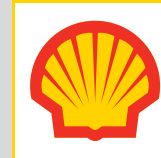


## ENERGY THROUGH THE AGES

NAME \_\_\_\_\_



Step into the Energy Time Machine. We are going back in time to examine how energy has been used in the past. No one can see us. We watch as a band of humans spends a considerable amount of time each day gathering water and wood for cooking. Carrying water and gathering wood are the order of the day. Searching for food is a constant. Little is thrown away, and there is no easy storage method. Food is made to last by drying it in the sun. It is a hard life.

Now, we go forward to the time of Roman Civilization. We look at a marketplace filled with goods to buy. Meat, bread, olives—the selection is vast. The grain for the bread is ground using energy from a water wheel. We walk past a public bathroom and the famous Roman baths. Wood is burned 24 hours a day to keep the public bath water hot. Thousands of workers gather the wood and bring it to homes, public baths, markets, wherever it is needed. The hills and mountains around Rome are stripped bare of firewood.

We then arrive in England in 1272. The skies are thick with smoke. The houses are much nicer, and coal is the fuel of note. Thousands of men work the mines each day. A coal-fired stove in each house generates the thick smoke and soot that covers everything.

Now we go forward again, and we arrive in the United States. It is in the evening sometime in 1846. We stand in a small cottage. The family inside lights a lantern filled with whale oil. What a terrible smell! The soot from the lamp coats the inside of everything inside the house. Long distance travel is not common.

Now back in our own time, what a change! In developed countries, kids no longer have to spend their whole day gathering water and wood. They can go to school, email their friends, download music, microwave a snack stored in a sealed plastic bag. Changes in energy have given civilization the gift of time. Energy comes from a wide variety of sources, but the primary ones are hydrocarbon-based coal, oil, and natural gas. These “fossil fuels” are America’s primary source of energy, accounting for 85 percent of fuel use. Energy choices can be measured in time counted by the hour and the work day.

### KILOWATT HOUR ACTIVITY

**Kwh:** this measurement of energy is the work performed by one kilowatt of electric power in one hour. The price of electrical energy is based on this unit. A 1,000 watt light bulb operating for one hour would use one kwh.

**Btu:** an abbreviation for British thermal unit, a standard unit of energy. One Btu is equal to the amount of heat required to raise the temperature of one pound of liquid water by one degree Fahrenheit.

(cont.)

Today, natural gas is the most widely used energy source in homes in the U.S. How much natural gas does it take to “energize” a home? It depends on the home, the appliances and how often they are used, and the heating and cooling systems, among other things. Electrical energy is primarily measured in “watts.” To get a sense of how much energy some appliances use in a month, fill in the chart below. Then follow the steps to see how much natural gas it would take to run these appliances for a month.

Appliance	Daily WATTS*	HOURS used per month	WATTS used per month	Equivalent Kwh
Television	113	X 60 hours		÷ 1000 =
Computer and Monitor	270	X 120 hours		÷ 1000 =
Clothes Washer	425	X 20 hours		÷ 1000 =
Clothes Dryer	3,400	X 20 hours		÷ 1000 =
			Total monthly kwh	=

\*Daily watts may vary by appliance. Numbers are for activity purposes only.

1. If 1 kwh = 3,400 Btu, how many Btu does it take to run these appliances for one month?

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2. If 1 cubic foot natural gas = 1,031 Btu, how many cubic feet of natural gas are needed to run these appliances for one month? (Round your answer to the nearest hundredth.)

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**Challenge:** Provide the pros and cons for coal, oil, and natural gas. Use the Internet and your science textbook to research the answers.

Visit [www.shell.us/energizeyourfuture](http://www.shell.us/energizeyourfuture) to see the History of Energy Timeline.

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