Energy Audit FAQ's

There are two versions of the *Personal Energy Audit Spreadsheet* and the *Personal Energy Audit: The Spreadsheet Investigation Sheet.*

The *Personal Energy Audit Spreadsheet* Version 1 is a more detailed spreadsheet than Version 2. Version 1 requires more data input and may therefore take more time for students to complete in an instructional setting. In Version 1, students input all their energy use values.

In Version 2, several items have been completed using typical household use values. These values include cleaning, heating, cooling, and transportation energy uses. If a student knows their energy use for a particular item that has a provided value, they may change it.

In both spreadsheet versions, if students or members of their household do not participate in a particular energy use activity, instruct them to enter a "0" in Columns B and C on their spreadsheet for that row.

The *Personal Energy Audit: The Spreadsheet Investigation Sheet* Version 2 has included cleaning, heating, cooling, and transportation values in a data table. These values are also included on the *Personal Energy Audit Spreadsheet* Version 2.

Implementation suggestion:
Select Version 1 or Version 2 based on the learning needs, capabilities of your students, and prior knowledge levels about personal and household energy use. In an integrated classroom setting, you might wish to use both versions of the spreadsheet and the investigation sheet to differentiate instruction.

The Basics
The purpose of this energy audit is to help students understand the monetary cost of their energy use. The mathematical calculations for each energy consumption cost were derived from a variety of sources including analyses of energy ratings for electrical appliances and energy use information provided by federal and university energy Web sites including:
• US Department of Energy' Energy Information Administration (http://www.eia.doe.gov/)
• Home Energy Advisor (http://hes.lbl.gov/)
• Energy Experts (http://energyexperts.org/)
These values are representative of kilowatt-hour costs and energy use patterns common in the Northeast region of the United States for an 1800 square foot home.

Energy Vampires
Many appliances use electricity when they are not actively being used and are in "stand-by" mode just by being plugged into an electrical outlet. Appliances that have clocks, alarms, or memory logs are examples of energy vampire appliances. Many chargers or adapters also use energy when they remain plugged-in after charging an appliance.

Simply unplugging adapters and appliances when they are not in use can result in measurable monetary savings.

What is the *Electrical Equivalent Out of Pocket Cost*?
All energy use costs have been converted to electricity equivalencies. Electricity costs were based on the national average of 11 cents per kilowatt-hour.

How are heating/cooling values determined?
The heating values are based on electric costs for whole house climate control units (furnaces/ air pumps/ air conditioning units) that utilize a circulation cycle.
Climate control systems that us oil or natural gas have slightly different costs due to fluctuations in fuel costs. The values in the energy audit were determined based on average cooling and heating costs for an 1,800 square foot home with average insulation in the Northeast region of the United States. A home's size, age, and climate control unit may affect a home's efficiency and its actual energy use costs.

In the learning activity, your students are asked to estimate the seasonal use time that a climate control unit is on in their home. The energy audit adjusts their calculation by dividing the daily energy used in the home for heating and cooling by a factor of 3 to account for system cycling, fluctuations in outdoor temperature, and variations in thermostat settings.

The BTU values seem so high. How are BTUs calculated?
In most energy consumption items on the energy audit, the BTU values were derived from known kilowatt-hour values. The formulas are embedded in the spreadsheet. For transportation values, BTU values and passenger miles were used to convert to kilowatt-hour values.

What if I use an oil heater in my house to heat up the water tank? *or* What if my gas heater turns on while heating water while I take shower?
When the boiler, gas furnace, or hot water heater is used in a home to heat water, it consumes additional energy. We recognize that the energy used by a boiler to heat water is not equivalent to that used by an electric or gas water heater. However, for the purpose of this learning activity these uses are comparable.

How are values for light bulbs determined?
Lighting costs were based on the use of 60W incandescent bulbs. If a student has CFL or LED lights in their home they may divide their time or appliance use by the following factors: CFL divide by 4, LED divide by 40.

Some students may have difficulty thinking about how many lights are being used in their home. To assist students have them estimate by counting the number of rooms where lights are left on in their home. Next, prompt students to think about how many lights are used in each of those rooms. If there is track lighting (multiple lights on one fixture) or recessed lighting (a series of light fixtures installed into a ceiling or cabinet), each fixture

that has a light bulb is counted. Most people use lights in their house during the early morning and evening hours. Average household use is approximately 8 hours a day.

In some homes students are not responsible for cleaning or doing laundry. What energy use values should they enter in the cleaning categories?
In the cleaning categories, enter the typical home use. An average family does 7 loads of laundry per week. Students would enter 7 for both *use the washing machine* and *use the dryer*. If their family hangs their clothes outside or in the basement to dry they would reduce the number of dryer loads accordingly. For other cleaning activities listed on the spreadsheet, you may want to suggest times and frequencies from your own household cleaning practices.

How should my students estimate transportation mileage? Should they try to estimate distances traveled by the whole family or their own personal mileage?
Your students can easily estimate family transportation totals. You may assume that most rural and suburban students travel *5-20 miles* of bus mileage per day to get to school. Since many urban school districts do not provide daily bus service, urban students are more likely to walk or ride a public bus to and from school. If urban students depend on automobiles for school transport, the commute per day is likely to be less than *6 miles round trip or 3 miles* each way.

Calculating whole family transportation usage is more difficult. Based on recent US Census Service data, Americans spend over 100 hours commuting to work during the year. The national average daily commute to work lasted about 24.3 minutes. In the Northeast United States, average commutes range from 25 to 50 minutes. Typical travel distances can range from 10 - 40 miles for daily round trip work commutes, or up to 200 miles per week. Personal driving for recreation or errands is highly variable. For the energy audit activity, you may assume that most families drive at least *100 miles per week*.

If your students are ambitious and want to figure exact travel mileage, they can use Google Earth or a local map to measure actual distances.

What does passenger mile/gallon equivalent mean?
A passenger mile /gallon equivalent is calculated first by dividing the fuel used by miles traveled to obtain the miles per gallon. Miles per gallon is then divided by the average number of passengers carried by a specific transportation type. This provides the passenger mile/ gallon equivalent.