Fuel Savings: Home Heating and Cooling

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About half of all energy used by a household goes to heat and cool the home. This is the place to make a difference—achieving a small amount of energy savings can have a big impact on the family heating and cooling budget. It can also impact the environment positively through reduced air pollution and help conserve natural resources.

**Fuel types**

Homes are heated and cooled today by a variety of methods. Being an energy-smart consumer means getting the most from the energy you use. Following are various fuel types used for heating and cooling homes.

**Natural gas** is used by 57% of U.S. homes. With electric forced air for heating and cooling, it is the most commonly used fuel today. It usually provides more heat per dollar than propane, fuel oil, or electricity. Natural gas is a reliable source with very few interruptions in service and requires no handling by the consumer. Since it requires a pipeline for continuous delivery, it may not be available in many rural areas.

**Electricity** is the cleanest source of heating and cooling for consumers. It is often used with an air or ground heat pump. Fuel sources supplying electricity through wires on poles are generally reliable but can be disrupted by wind, ice, and lightning storms. Electricity as a heat source is used by 31.3% of U.S. homes.

**Fuel oil** is used to heat many older homes. About 8.3% of U.S. homes use this (not the cleanest burning) fuel. It is generally less expensive when purchased in late summer/early fall before the price goes up for the winter months.

**Propane or liquefied petroleum (LP)** is less expensive than fuel oil but more expensive than natural gas. It is also generally less expensive when purchased in late summer/early fall. Propane is delivered to homes in refillable tanks and is used by most rural households.

**Wood**, when burned in a stove, is much more efficient than burned in a fireplace. The scarcity of wood in most parts of South Dakota makes it a poor choice of fuel for heating the home.

**Coal** provides a lot of heat, but, depending on the type of coal, may emit environmental pollutants. Although coal may be the least expensive of the fuels listed, it can be dirty to handle.

**Kerosene** is used in space heaters, cook stoves, and water heaters. It is suitable as a light source when burned in wick-fed lamps. Generally it is more expensive than fuel oil but burns cleaner.

**Solar** is not as dependable as other fuels because South Dakota has fewer degree-heating days than southern states. Solar would need to be used with other systems.
Wind is an increasingly popular source of energy used to produce electricity.

Geothermal or ground water requires a pipe system that needs land space and electrical pumps. Capital costs are high, but operating costs are relatively low compared to other fuels.

Corn or wood pellets vary in energy value depending upon moisture content. The cost of corn and wood pellets is also variable, so it is difficult to estimate the efficiency of heat production. Modern furnaces have automated the manually fed burners that used to require almost constant attention.

Practices

Get an energy assessment of your home. But before calling in a professional to analyze your present heating and cooling systems, ask what the charge is to determine ways to lessen your energy use. A general assessment is usually free, but, to determine exact efficiency of your equipment, expect them to charge a fee.

Or go online at http://www.energystar.gov/ for a home energy analysis of your current energy use.

Stop air leakage. Seal up holes; weather strip doors, caulk pipes and wires; and maybe add insulation in attic floors, basements, walls, and crawl spaces.

Always air seal before adding insulation. Insulation works best when air is not moving through or around it. Therefore, it is very important that air leaks be sealed to ensure that you get the full performance out of any insulation that is installed.

Install sufficient insulation in the attic. Insulation is designed to resist heat flow; that is, if it is hot outside, insulation greatly reduces the amount of heat you can feel inside a house. Or, if it is cold outside, insulation helps keep the heat inside the house.

For biggest savings, the easiest place to add insulation is in the attic. The U.S. Department of Energy provides recommended R-values (or thermal resistance factor) that specify the level of insulation needed for homes in the Midwest. View these values on the DOE insulation guide online at http://www.eere.energy.gov/consumer/your_home/ to determine what is most cost-effective for your home.

The most common types of insulation are fiberglass (batt and blown), cellulose, rigid foam, rock wool, and spray foam.

Apply inexpensive plastic sheeting over windows. This is especially important in reducing drafts if you have single-pane windows; the plastic provides an insulating barrier against cold air.

Close the damper on the fireplace. When not in use, a closed damper prevents a major draft. Don’t forget to open the damper before starting a fire.

Rely more on warm clothing. Layering clothing, choosing materials with greater insulation value, and keeping your arms and legs covered and warm will allow you to use a lower thermostat reading, thus heating your home more economically in the cold winter months.

Close off heat in seldom-used areas of the home. In very cold weather, shut off the air vents, close the doors, and place a towel under the door to reduce the draft (unless there is a risk of pipes freezing).

Keep air circulating. Use electric fans, evaporative coolers, or heat pumps instead of air conditioners when possible. Ceiling fans can create more air movement and limit the use of air conditioners during hot summer days.

Consider landscaping. Provide summer shade for the roof, walls, and other parts of the house to reduce heat absorption and to save energy dollars.

Operation

A programmable thermostat can save dollars on your heating and cooling bills. Once such a thermostat is installed and programmed, the heat will automatically be turned down when you are at work or asleep and turned back up when you arrive home or wake up.

Lowering your thermostat by 1º F will typically reduce your heating bill by 1 to 3%.

Maintenance

Get, or do it yourself, an annual maintenance check. Don’t wait until just before it is needed; make the annual checkup well before its anticipated use. Have a professional inspect wood and coal stoves, fireplaces, chimneys, and chimney connectors annually and clean as
often as inspections suggest. Fireplace and chimney fires are mostly caused by a buildup of flammable creosote, the product of wood smoke and moisture. Burn properly seasoned wood; wood that is green has more moisture and is likely to smolder, leading to more creosote buildup. Have furnaces inspected and serviced annually. Change or clean the furnace filter as often as needed or quarterly. Maintenance on all types of heating and cooling systems is important but more so when fuel oil is used.

Check the furnace vent. For a furnace to be effective, it must be properly vented. Be safe, consult a specialist in heating and cooling.

Wise purchases
Look for use and efficiency labels. If you don’t see an ENERGY STAR® label on heating and cooling equipment, ask a salesperson for the information. Manufacturers and retailers can voluntarily place ENERGY STAR® labels on those appliances that meet or exceed standards set by the U.S. Environmental Protection Agency and the U.S. Department of Energy. Such labels can make purchasing decisions easier.

These products not only save energy; they help prevent air pollution and save money, frequently with better performance.

Compare capacities of different heating systems.
Capacity is the amount of heat your system is capable of generating in an hour. It is calculated in units of heat or British Thermal Units or BTUs per hour. If your house has more than one heating system, enter the total capacity (add the capacities for each system together). Look for this information on the name plate of the heating system and in the manufacturer’s product literature.

Look for energy-saving features when installing windows. Important features to employ are double panes; thick air space between panes (maximum effectiveness is 1 inch); tinted glass (e-coating) that does not inhibit visibility; and use of wood, vinyl, or fiberglass frames. Select windows with low air leakage ratings (between 0.01 and 0.06 cfm/ft).

Ask about special energy-efficiency offers. Ask your salesperson or local utility about qualifications for cash rebates, low-interest loans, or other incentive programs in your area for energy-efficient product purchases.

Investigate LIHEAP (Low Income Home Energy Assistance Program). This program exists to assist eligible households having trouble paying the cost of heating or cooling in residential dwellings. The federal government provides the funds to the states that administer the program.

Summary
Families need to evaluate their specific home situation—their current home heating and cooling practices, purchasing patterns, operating procedures, and equipment maintenance.

Remember that energy consumption varies widely due to variations in efficiency, how heat and cooling devices operate, and other factors. Consider the suggestions provided to help you cut home energy bills. Keep a record of what you pay prior to and after adopting fuel saving ideas to see how you are doing.

References