Energy Saver 101:
EVERYTHING YOU NEED TO KNOW ABOUT

HOME HEATING

DID YOU KNOW?

45%

Space heating is the largest energy expense in your home, accounting for about 45 percent of your energy bills.

57%

The most common home heating fuel is natural gas, and it's used in about 57 percent of American homes.

Between 2007 and 2012, the average U.S. household spent more than **$700** on heating using **natural gas** & **$1,700** on heating homes **using heating oil.**

ENERGY-SAVING TIP

Before upgrading your heating system, improve the efficiency of your house. This will allow you to purchase a smaller unit, saving you money on the upgrade and operating costs.

HOW HEATING SYSTEMS WORK

All heating systems have three basic components.

If your heating system isn't working properly, one of these basic components could be the problem.

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The heat source -- most commonly a furnace or boiler -- provides warm air to heat the house.

The heat distribution system -- such as forced air or radiators -- moves warm air through the home.

The control system -- most commonly a thermostat -- regulates the amount of warm air that is distributed.

DID YOU KNOW?

Furnaces and boilers are often called **CENTRAL HEATING SYSTEMS** because the heat is generated in a central location and then distributed throughout the house.

ENERGY-SAVING TIP

INSTALL A PROGRAMMABLE THERMOSTAT and save big on your energy bills! Save an estimated 10 percent a year on heating and cooling costs by using a programmable thermostat.

TYPES OF HEAT SOURCES FOR HEATING SYSTEMS:

	FURNACES	BOILERS	HEAT PUMPS	ACTIVE SOLAR HEATING	ELECTRIC HEATING
	A furnace heats air and uses a blower motor and air ducts to distribute warm air throughout the house.	A boiler heats water to provide hot water or steam for heating that is then distributed through a series of pipes.	A heat pump pulls heat from the surrounding air to warm the house. It can also be used for home cooling.	The sun heats a liquid or air in a solar collector to provide immediate heat or store it for future use.	Sometimes called electric resistance heating, electric heating is any process in which electricity is converted into heat.
EFFICIENCY	59-98.5%, depending on the system's age	50-90%, depending on the system's age	6.8-10 HSPF	Not applicable	95-100%
LIFE EXPECTANCY	15-30 years	15-30 years	15 years	20+ years	20+ years
FUEL	Natural gas, propane, heating oil, electricity	Natural gas, propane, heating oil, biodiesel blends, electricity	Electricity, geothermal energy	Solar energy	Electricity
PRO	Inexpensive	Easier to practice zone heating (only heating the rooms you use in your home).	Can provide both your heating and cooling needs if you live in a mild climate.	Can reduce your fuel bills.	Can be used for a number of distribution heating systems.
CON	The blower fan can be loud.	Expensive to install and requires a minimum temperature to prevent pipes from freezing.	Some types can be expensive to install.	Can require a second heating source, which makes the initial purchase more costly.	Can be expensive to operate compared to combustion appliances.

TYPES OF DISTRIBUTION SYSTEMS FOR HEATING SYSTEMS:

	FORCED AIR SYSTEM	STEAM RADIANT	RADIANT HEATING	HOT WATER BASEBOARDS	ELECTRIC BASEBOARDS
	The most common type of home heating system, a forced air system distributes heat from a furnace throughout the home using air ducts and vents.	One of the oldest types of heating systems, steam radiant heating uses radiators to distribute heat.	Radiant heating -- which can be installed as floor, ceiling or wall panels -- transfers heat directly from a hot surface to people and objects in the room.	Similar to radiant heating, hot water baseboards (also called hydronic heat) use hot water to heat a space via wall-mounted baseboard units.	A type of zone heater, electric baseboards release heated air out of the top while pulling cooler air to the bottom of the unit.
PRO	Can be used for cooling.	Relatively trouble free.	Doesn't distribute allergens.	Provide close temperature control.	Quiet operation and low maintenance.
CON	Distributes allergens throughout the house.	Requires separate distribution system for cooling systems.	Can be expensive to install and repair if problems arise.	Limits furniture placement and slow to increase temperature.	Limits furniture placement and easily damaged.
ENERGY-SAVING TIP	Clean your air filters monthly and replace them regularly.	Put foil behind the radiator to reflect the heat into the room.	When installing in a wood-framed floor, consider covering it with ceramic tiles, which add thermal mass.	Install a programmable thermostat to take advantage of zone heating.	Clean the heating coils regularly to prolong the heater's life and maintain its efficiency.
COMPATIBLE HEAT SOURCE SYSTEM(S)	Furnace, heat pump, active solar heating	Boiler	Boiler, heat pump, active solar heat, electric heating	Boiler, active solar heating	Electric heating

MEASURING A HEATING SYSTEM'S EFFICIENCY

The efficiency of **COMBUSTION HEATING APPLIANCES (FURNACES AND BOILERS)** is measured by **ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE).**

AFUE = how efficient the appliance is at converting the energy in its fuel to heat ÷ the annual fossil fuel energy consumed by the appliance.

furnace

boiler

- 56-70% AFUE — old, low-efficiency heating systems
- 80-83% AFUE — mid-efficiency heating systems
- 90-98.5% AFUE — high-efficiency heating systems

A **HEAT PUMP** can be used for both heating and cooling.

A heat pump's cooling efficiency is measured using the seasonal energy efficiency ratio (SEER), while its heating efficiency is measured using **heating season performance factor (HSPF)** or **coefficient of performance (COP),** depending on the type of heat pump.

WHAT'S THE DIFFERENCE?

HSPF = total space heating required during the heating season ÷ the total electrical energy consumed during the same season. HSPF ranges from 6.8-10.

COP = heat provided ÷ the amount of energy input. COP ranges from 2-4.

TYPES OF SPACE HEATERS

Sometimes call point-of-use heaters, space heaters provide supplemental heat to a specific room. Since safety is a big concern with space heaters, every home should have a carbon monoxide detector installed.

WOOD OR PELLET STOVES

Wood-burning stoves are a good heating option for those who live in an area where wood is readily available. Pellet stoves typically are more efficient than wood stoves but may require servicing.

SAFETY

Follow manufacturer instructions for installation and make sure to have your wood and pellet stoves regularly cleaned to improve efficiency and safety.

PORTABLE & DIRECT VENT WALL HEATERS

Portable heaters are used when the main heating system is inadequate or when central heating is too costly to install or operate. Portable heaters can either be electric or combustion.

SAFETY

If not used properly, unvented portable combustion heaters can be dangerous -- causing carbon monoxide poisoning, severe illness and even death. To ensure safe operation, follow all manufacturer directions. All unvented combustion space heaters should be labeled to verify compliance with ANSI Z21.11.2.

FIREPLACE

While some fireplaces are only decorative, others can be used as a heating source. Installing a heat-air exchange system in the chimney will help blow the warm air back into the room.

SAFETY

Fireplaces should be inspected regularly to ensure the chimney is clean and that the fireplace drafts properly.

SELECTING A HEATING SYSTEM

Before replacing your heating system, consider the following:

FUEL — The heating fuels available depend on where you live in the U.S. For example, in the Northeast heating oil is more popular because there is limited access to natural gas.

CLIMATE — The type of heating system you buy will depend on where you live. In warmer climates, you might only need space heaters, while in colder climates, you might consider a central heating system.

EFFICIENCY — The higher a heating system's efficiency is, the higher the purchase cost but the lower the operating costs. Look for ENERGY STAR products, which exceed the minimum standards for efficiency and quality.

SIZE — Proper sizing is as important as efficiency. If your heating system is too big for your home, it will cost more to operate. Work with a professional contractor to find and install the best heating system for your home.

HEATING SYSTEM MAINTENANCE

Periodic maintenance can extend the life of your heating system and minimize efficiency loss.

CLEAN FILTERS MONTHLY and replace them regularly.

Check air ducts and heating pipes to make sure they are **PROPERLY SEALED.**

REMOVE DIRT, SOOT OR CORROSION FROM THE SYSTEM, and clean the heat exchanger to maintain heating levels.

Make sure air vents, baseboard heaters and radiators aren't obstructed.

TIPS FOR CUTTING YOUR HEATING BILLS

- In winter months, open your curtains during the day to naturally heat your home and close them at night to keep the heat inside.
- Use a programmable thermostat to set your heater back while you are away or asleep.
- Consider air sealing your home and adding insulation to your walls and attic to help retain your home's heat. Up to 25 percent of your home's heat is lost through small cracks and holes throughout your home.
- Seal your air ducts, and make sure they are properly insulated when they are installed in an unheated area of the home, such as an attic or crawlspace.
- Weatherstrip around your doors and windows to keep warm air from escaping.
- Set your ceiling fan to spin clockwise to blow the rising hot air down.
- Make sure your chimney is clean.

Sources: Energy Saver (www.energy.gov/energysaver), Weatherization Assistance Program Technical Assistance Center (http://waptac.org/) and U.S. Energy Information Administration (www.eia.gov).

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