



# The basics of home heating

## FACT SHEET

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Your home's heating system performs a simple but important job—keeping your home warm during cold winter months. Because home heating affects comfort and energy bills in a big way, now is the time to learn about your options, before you build a home or have to replace a broken furnace. This fact sheet will explain some of the basics so that you can make an informed choice.

### HEATING SYSTEMS: BIG ENERGY USERS

A heating system is among the largest home energy users. Furnaces and boilers are also a substantial investment, costing thousands of dollars and lasting 17 to 20 years. Therefore, it's important to choose a heating system that offers comfort, reliability, and low operating and maintenance costs.

### TYPES OF HOME HEATING SYSTEMS

There are five basic types of home heating systems: forced-air, hot water, electric baseboard, portable electric space heaters and heat pumps.

#### Forced-air

Forced-air is the most common type of heating system. Forced-air furnaces can be powered by natural gas, liquid propane, fuel oil or electricity. They work by circulating warmed air through duct systems which direct air to various rooms in your house. Typically, the air is moved by a powerful fan located inside the heating unit.

Forced-air systems are easily identified by their visible registers—located on floors, ceilings or walls—that allow heated air to flow into the rooms of your home. A different set of ducts, called cold-air returns, draw air back into the furnace for re-heating.

If you're in the market for a new forced-air furnace, buy a unit that is at least 90 percent AFUE\* efficient and uses an electronically commutated motor (ECM). This type of furnace will save on natural gas as well as electricity, which is needed to drive the furnace fan.

#### Hot water

Another type of home heating system is hot water heat. These systems typically use a gas- or oil-fired hot water boiler, which circulates hot water through a system of pipes in the floor connected to baseboard heating units or radiators.



**Buy a furnace that saves both natural gas and electricity by choosing a high efficiency unit with an ECM motor.**

A hot water heating system can be very comfortable. The radiant heat provides warmth and there is no draft created by air circulation. If you're considering a hot water heating system, buy an ENERGY STAR® qualified unit. ENERGY STAR qualified boilers have a rating of 85 percent AFUE or greater and use 7 percent to 10 percent less energy than a conventional unit meeting minimum federal standards.

#### Electric baseboard and space heaters

Electric baseboard heaters are often referred to as "zoned" heaters because they target heat to specific areas of a house. Electric baseboard heat is the least expensive to install and maintain, but the most expensive to operate. However, they can be useful when heating is only needed in certain areas at specific times.

Portable space heaters are sometimes used as a heating supplement. However, they are not a cost effective way of heating your home and can be dangerous if left unattended or used improperly. Never place flammable objects on or near a portable space heater—they may ignite and start a fire.

\*AFUE = Annual Fuel Utilization Efficiency

### Heat pumps

Heat pump systems come in two types: air-to-air systems, which extract warmth from outside air, and ground-to-air systems (also called ground-source units), which extract warmth from the ground.

Air-source heat pumps are better suited to milder climates, while ground-source heat pumps use less electricity in Wisconsin. Ground-source systems do not usually need backup heat because the ground temperature remains constant at 45°F to 55°F all year round. However, even a ground-source heat pump may not be able to completely meet a home's heating needs on the coldest days of the year. Thus, these units are usually equipped with electrical backup heat.

#### HOW HEAT PUMPS WORK

Ground source heat pumps work by removing warmth from the ground and sending it inside during the winter. In the summer they can also provide air conditioning by removing warmth from your home and sending it back into the ground. Heat pumps rely on a traditional duct and register system (used in forced air furnaces) to distribute conditioned air. Though they don't burn fossil fuel, heat pumps do use electricity to provide heating, but in a much more efficient manner than electric baseboard or portable space heaters.

### CONTROLLING COMFORT

#### Thermostats

Thermostats provide direct control over your heating system. There are two basic types: standard and programmable. A standard thermostat lets you set one temperature only, which your heating system seeks to maintain 24 hours a day, seven days a week.

A programmable thermostat, on the other hand, allows you to select different temperatures for different times of day and different days of the week. For instance, a programmable thermostat can lower the temperature at night when you're sleeping, then raise it back up before the alarm clock goes off. This saves money by letting your heating system work only as hard as it needs to for comfort. If used correctly, a programmable thermostat will pay for itself in about two years. However, you can get the same benefit for free if you are willing to regularly turn down a standard thermostat when you are away or sleeping.

### Zoning

Some heating and cooling systems can be designed to maintain different temperatures in different rooms. This is referred to as zoning and is the most effective option for controlling comfort. The trade-off is that zoned systems are generally more complex and expensive. This is due to a combination of multiple thermostats and motorized dampers, which open or close air pathways inside the ductwork depending on the temperature needs of the areas they serve.

For more information on zoned heating and cooling systems, contact a heating contractor.

### INSULATE FIRST

When you buy a new heating system, be sure to check your home's insulation levels. As many as a third of Wisconsin homes are poorly insulated. Sealing leaks and correcting poor attic and wall insulation will dramatically lower your energy bills, increase comfort, and may allow you to purchase a smaller, less expensive heating system. Insulation can pay for itself in as little as two years.

### FOR MORE INFORMATION

[focusonenergy.com](http://focusonenergy.com)

Contact Focus to learn more about smart energy choices.

[energystar.gov](http://energystar.gov)

The ENERGY STAR Program provides information on energy efficient products that meet ENERGY STAR standards.

<http://www.state.mn.us/cgi-bin/portal/mn/jsp/home.do?agency=Commerce>

Click on the Energy Info Center link to view the "Home Energy Guide: Techniques, Tactics and Tips," from the Minnesota Department of Commerce, Energy Information Center. This series includes a guide on home heating.

#### "Choosing an Efficient Furnace"

The "Choosing an Efficient Furnace" fact sheet is published by Focus on Energy and explains in detail how to choose an energy efficient forced-air furnace. Contact Focus on Energy for a copy.

[ftc.gov/bcp/conline/pubs/homes/heatcl.htm](http://ftc.gov/bcp/conline/pubs/homes/heatcl.htm)

"Heating and Cooling Your Home," an article published by the Federal Trade Commission, explains Energy Guide labels and terminology related to heating system efficiency.

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