The basics of home heating

FACT SHEET

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Your home's heating system performs a simple yet 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 equipment: forced-air furnaces, boilers, electric baseboard, portable electric space heaters, and heat pumps.

Forced-air furnace

A forced-air furnace is the most common type of heating system in Wisconsin. 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 directs air to various rooms in your home. 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—which blow warm air into your home or draw cool 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 a variable speed motor. Focus on Energy also recommends having the furnace modulate, or stage the heat output for additional savings. This type of furnace will save on natural gas as well as electricity, which is needed to drive the furnace fan.

* AFUE = Annual Fuel Utilization Efficiency

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

Hot water boiler

Another type of home heating equipment is a hot-water boiler. These systems typically are gas- or oil-fired, and circulate hot water through a system of pipes in the floor, baseboard heating units, or radiators.

A hot-water heating system can be very comfortable. The radiant heat provides warmth without the draft created by air circulation. If you're considering a hot water heating system, Focus recommends a 90 percent AFUE modulating boiler with an outdoor temperature reset to maximize energy savings and comfort.

Electric baseboard and space heaters

Electric baseboard heat is the least expensive to install and maintain, but is usually the most expensive to operate. Portable space heaters are sometimes used as a heating supplement, however, they are not a cost-effective way to heat your home. If you must use a space heater, you will get the most out of it if you use it in a room that is completely closed off from the rest of your home and if you drastically reduce the temperature at the main heating system's thermostat. Remember, space heaters 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.

Heat pumps

Heat pump systems come in two types: air-source, which extract heat from outside air, and ground-source (or geothermal), which extract heat from the ground. Both air-source and ground-source heat pumps can be used effectively in Wisconsin homes. A ground-source heat pump will likely have higher efficiencies than an air-source heat pump, but will be significantly more expensive to install than an air-source unit. It is important to remember that both types of heat pumps use electricity to heat, so although they may reduce your gas usage they will likely increase your electrical usage. To get the most out of your heat pump, be sure that your contractor sizes it properly using manufacturer-approved designing programs, and carefully considers the auxiliary or back up heat that might be used during extremely cold periods.

HOW HEAT PUMPS WORK

Ground-source heat pumps work by removing heat from the ground and sending it inside during the winter. In the summer they also provide air conditioning by removing heat from your home and sending it back into the ground. An air-source heat pump works the same way, except it pulls or rejects air from the outside air instead of the ground. Most heat pumps rely on a traditional duct and register system (used in forced air furnaces) or radiant in-floor piping to distribute conditioned air. Heat pumps 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 until you adjust the temperature setting.

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 from a standard thermostat if you regularly turn it down 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 more 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

Before 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 and increase comfort. Insulation can pay for itself in as little as two years and may allow you to purchase a smaller, less expensive heating system.

FOR MORE INFORMATION

"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 and to learn more about smart energy choices.
focusonenergy.com

The official ENERGY STAR® Web site

Learn more about energy-efficient products that meet ENERGY STAR standards.
energystar.gov

Click on the Energy Info Center link to view the "Home Energy Guide" from the Minnesota Department of Commerce, Energy Information Center. This series includes a guide on home heating.
www.energy.mn.gov

"Heating and Cooling Your Home," an article published by the Federal Trade Commission, explains Energy Guide labels and terminology related to heating system efficiency.
ftc.gov/bcp/edu/pubs/consumer/homes/rea05.shtm

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