SAVE MONEY ■ SAVE TIME ■ SAVE ENERGY

Heating your home

PowerHouse®

Presented by ALLIANT ENERGY®

Conservation; your greatest defense against high heating costs

You probably remember your parents say, "Close the door, we can't afford to heat the entire outdoors!" That's because heating is the largest energy expense in most Midwest homes.

In fact, about two-thirds of your annual energy bill goes to heat your home.

That's why conservation measures that reduce the need for heating energy ... like closing the door when it's cold outside … provide the greatest cost savings. And, when teamed with the use of high-efficiency heating equipment, the potential for savings is even greater!

Heating things up

Your heating system, whether it's a propane-fired boiler, a wood stove or a forced-air furnace fueled by natural gas, works to replace the heat that is lost through the shell of your home.

The amount of energy required depends on four things:

1. The climate in which your home is located
2. The size of the structure
3. The energy efficiency of your home
4. The energy efficiency of your heating system

Since it's not always possible or practical to change the location or size of your home, reducing your need for heating energy comes from improving the energy efficiency of your home and heating system.

Heating systems 101: the basics

All central heating systems have three basic components.

1. The heat production component where fuel is converted to heat
2. The distribution system that gets the heat to where you want it
3. The controls that regulate the demand for heat

Types of heating systems

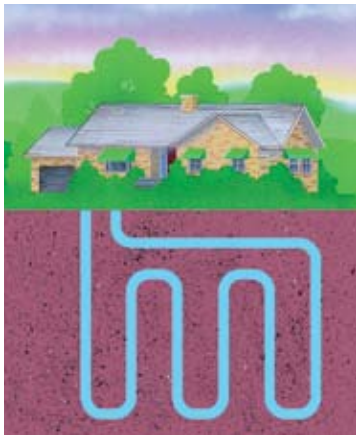
Forced-air furnace

The majority of American homes are heated with a forced-air furnace, most commonly fueled by natural gas, but they can also be fueled by electricity, liquid propane (LP) or fuel oil. A forced-air furnace works by drawing air from inside the home, passing it through a filter and then passing it over a metal heat exchanger. The heat exchanger is usually warmed by a flame or sometimes with heated electric coils. A blower sends the warmed air through the house using metal ductwork. The warmed air enters the room through a register or grill in the floor, wall or ceiling. Indoor air as it is circulated through the system is filtered, to reduce dust, pollen and other airborne particles. Cold air from the home is pulled back into the ductwork through cold air returns and is then heated, completing the cycle.

Gas- or oil-fired boiler

Some homes have a boiler, fueled by natural gas, liquid propane (LP) or fuel oil. Rather than warming the air and distributing it throughout the home with a blower, a boiler works by heating water and circulating it through pipes to radiators, where radiant heat warms the area. Some systems cycle the warmed water through the floor or walls to keep the house warm.

Electric heat pump



Another home heating option is an electric heat pump. These work much like a forced air furnace moving warmed air through metal ductwork. Instead of needing to burn a fuel or heat an electric coil they work by transferring existing heat from one area to another. Because a heat pump uses electricity to *transfer* heat rather than *generate* it, it can actually deliver more energy than it consumes. Heat pumps move existing heat from one area to another in one of three ways:

- *Ground-to-air*: Also known as a geothermal system or ground source heat pump, this type uses underground loops to absorb heat from the earth. Geothermal systems are most-often installed in newly-built homes, but can also be retrofitted for an existing home. This is the type of heat pump most frequently used in Midwest climates.
- *Water-to-air*: Instead of extracting heat from the outside air, this type of pump absorbs heat from ground water or surface water, such as a farm pond.

- *Air-to-air*: A condenser absorbs heat from the outdoor air (even the coldest air contains some heat) and transfers it to an indoor heat exchanger. Indoor air is warmed in the heat exchanger and circulated throughout the home.

One advantage of a heat pump is that it provides both heating and cooling capabilities in one unit. During the summer, the process is reversed to cool and dehumidify the home. Electric heat pumps are usually supplemented with a backup system, such as radiant floor heaters or baseboard units in case of extended periods of extreme temperatures. Heat pumps also use filters to reduce airborne particles and keep the unit clean.

A ground-to-air, or geothermal, heat pump is the most energy-efficient choice for most homes. It uses a naturally-renewable form of energy – underground heat – and requires only a minimal amount of electricity to circulate warmed (or cooled) air through the home. But because the underground loops require extensive excavation, geothermal systems are usually installed in new-construction homes. However, you will recoup the extra cost in about seven years due to heating bills that are 50 percent lower and cooling bills that are 30 percent lower. For additional information visit our Web site: *www. alliantenergygeothermal.com.*

Electric resistance heating

Electric resistance heating is usually found in the form of baseboard heaters but can also be heating coils in ductwork with a fan to move the air. It was popular during the 1940s and 1950s, and is often used in multi-family dwellings like apartment houses. A baseboard unit has an electric heating element encased in metal pipe. Air warmed by the heating unit rises to the top of the room, and cooler air is drawn into the bottom of the heater. Each unit has a separate thermostat to allow for different temperatures in each room.

Electric resistance heat is usually the most expensive form of heat and is seldom recommended.

Radiant heating

This form of heating is making a comeback in many new homes. Instead of circulating heat by moving the air in the room, a radiant system heats objects – including people. The most common form is radiant floor heating, which uses electric cables or small tubes of hot water embedded in a concrete floor or under a tiled floor. During the height of its popularity during the 1940s and 1950s, radiant heating was also installed in wall or ceiling panels.

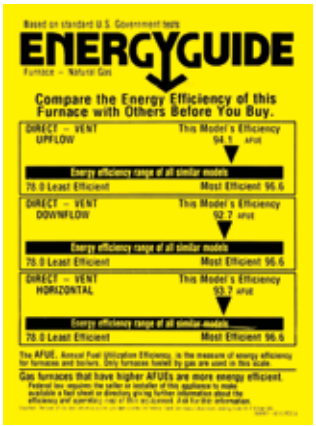
Homeowners in the Midwest usually use radiant heating as a supplement to a primary heating system. It's most often installed under the floor in uncarpeted areas such as kitchens, bathrooms, laundry rooms and garages.

When should you replace your heating system?

If your heating system is old, inefficient or significantly oversized, you may save money in the long run by replacing it with new, more efficient equipment. A typical heating system will last approximately 20 years.

The energy efficiency of a heating system is measured by its AFUE – ***annual fuel utilization efficiency***. This calculates the percent of energy used that is returned to the home in the form of warm air, factoring in "warm up" and "cool down" periods.

Today's high-efficiency furnaces have an average AFUE rating of 93.2 percent, meaning that for every dollar you spend on heating energy, 93.2 cents is put back into your home as warmed air. Furnaces manufactured 30 years ago had average AFUE ratings of only 55 to 62 percent.


Based on standard U.S. Government tests

ENERGYGUIDE

Furnace — Natural Gas

Compare the Energy Efficiency of this Furnace with Others Before You Buy.

DIRECT – VENT UPFLOW — This Model's Efficiency 94.5 AFUE

Energy efficiency range of all similar models

78.0 Least Efficient — Most Efficient 96.6

DIRECT – VENT DOWNFLOW — This Model's Efficiency 92.7 AFUE

Energy efficiency range of all similar models

78.0 Least Efficient — Most Efficient 96.6

DIRECT – VENT HORIZONTAL — This Model's Efficiency 93.7 AFUE

Energy efficiency range of all similar models

78.0 Least Efficient — Most Efficient 96.6

The AFUE, Annual Fuel Utilization Efficiency, is the measure of energy efficiency for furnaces and boilers. Only furnaces fueled by gas are used in this scale.

Federal law requires the seller or installer of this appliance to make available a fact sheet or directory giving further information about the efficiency and operating cost of this appliance. Ask for this information.

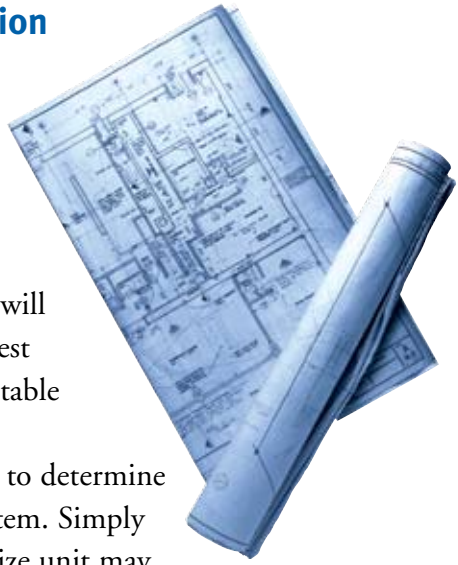
Gas furnaces that have higher AFUEs are more energy efficient.

The black and yellow **Energy Guide** label on a heating unit provides other details about its energy consumption. The largest number shows the estimated annual operating cost, based on national average utility rates. You'll also see how the appliance compares to other models of the same size.

You can also look for the ENERGY STAR® label from the Environmental Protection Agency and the U.S. Department of Energy. This identifies appliances as being the most energy-efficient products in their category. They usually exceed minimum federal energy-use standards by a substantial amount.

Choosing a new heating system

System size – a critical decision



A system that is too large wastes energy. In addition to the initially higher cost for the equipment, the rapid on/off cycling uses more energy and puts more wear and tear on the system. A properly sized unit will run almost continuously on the coldest day of the year to maintain a comfortable temperature in your home.

A heat loss analysis is the only way to determine the proper size for a new heating system. Simply replacing your furnace with a same-size unit may not prove to be the most energy-efficient choice. A heat loss analysis includes measurements of wall, ceiling, floor and window areas. It also takes into consideration levels of insulation and weatherization.

A heat loss analysis is often referred to as a "Manual J" calculation. Ask to review a copy of the heat loss and system sizing calculations to see how they were performed.

Consider purchase price AND cost of ownership

When choosing the heating system for your home, keep in mind that the purchase price doesn't equal the cost of ownership. High-efficiency systems will have a higher initial price because of the more sophisticated technology involved – but the money you save in energy costs can pay for the difference in just a short time.

For example, a geothermal system can cost an additional 50 percent or more than a standard forced-air furnace – but the energy savings can pay back the difference within three years. The entire system can pay for itself in as little as seven years – and the life expectancy is 25-30 years! Your heating dealer can help you determine how much energy you can save and how long the payback period will be.

The type of system that's best for you depends on the size, style and age of your home, as well as the type of energy available.

Natural gas – a good choice

An energy-efficient and practical choice for an existing home is often a natural gas forced-air furnace.

Some natural gas furnaces, labeled as "super efficient," have a secondary heat exchanger to reclaim heat from the water vapor produced by the primary heat exchanger. This option can reduce heating costs by another 20-30 percent.

If natural gas is not available in your area and a geothermal system is not an option, consider an air-source electric heat pump. These systems, which provide both heating and cooling, provide the most efficient use of electricity and avoid the inconvenience and safety concerns of liquid propane or fuel oil.

Choosing a heating contractor

When it comes to maintaining and/or replacing your heating system, you'll want a reliable professional on your side. A good place to start your search is with Alliant Energy's online Dealer Locator at *www.alliantenergy.com/dealerlocator*, or by calling 1-800-723-7635. The heating and cooling professionals featured in our Dealer Locator participate in Alliant Energy's Efficiency Solutions Participating Dealer program, which ensures energy expertise, quality workmanship and excellent customer service. They'll help you choose the right equipment for your needs, and they'll make energy efficiency a top priority. Here are some additional tips for locating a heating contractor:

1. Do your homework. Before you start making calls, know the make, model and age of your existing system. Make a list of any problems you are having.
2. Look for special offers. A new furnace is a big investment. Although price isn't your primary consideration, you can still take advantage of any applicable rebates or manufacturer incentives to keep the price manageable.

3. Ask about certifications. Ask the contractor if their technicians have North American Technician Excellence (NATE) certification. It's the leading testing and certification program.
4. Ask for references and call them. Be sure to ask about performance, timeliness and accessibility.
5. Get an in-home evaluation. The contractor should inspect not only your current heating system, but your entire home. Only then can he determine what size system is required. Remember ... bigger is not always better!
6. Look for the ENERGY STAR certification. ENERGY STAR rated products meet stringent standards for energy efficiency, as determined by the Environmental Protection Agency. Ask the contractor if the recommended equipment meets ENERGY STAR guidelines.
7. Get it in writing. Get an itemized estimate. Make sure it details the size, make and model of heating system being installed, and specifies any additional ductwork, etc.
8. When the work is completed, make sure you receive the owner's manual, warranty documents, and maintenance schedule for your new system. Have the contractor show you how to change filters and perform routine maintenance tasks.

Insulation and weatherization

While the type of heating system you have is important, don't forget about other factors that can affect how well your system works:

- Insulation: Attic insulation plays a critical role in heating efficiency. If your attic insulation measures less than 15 inches (R-38), it's definitely worth the investment to upgrade.
- Weatherizing: Don't let the warmed air escape from your home through holes and cracks. These easy weatherizing tasks can significantly reduce heat loss:
  - Remove window air conditioners or cover tightly.
  - Caulk around the exteriors of all windows and doors, and around all other openings like dryer vent and sump pump pipes.
  - Use weatherstripping on all doors.
  - Install safety caps in all outlets and foam gaskets behind switchplate covers.
- Ductwork: Most heating dealers recommend insulating ductwork in unconditioned spaces, such as unfinished basements and crawlspaces. Joints between duct sections should be sealed tightly ***UL-181 certified duct tape*** or ductwork mastic. Ironically, the common duct tape we all use for household repairs shouldn't be used on heating ducts because it will deteriorate becoming brittle and cracking easily.

Simplify your life with a clock-programmable thermostat

Your heating system will run most efficiently if you know how to use the thermostat effectively. The best and easiest way to manage your energy use is by using a clock-programmable thermostat. These devices are considered an integral part of new high-efficiency systems, but also can be used with existing central heating systems.

A clock-programmable thermostat allows you to set the room temperatures at different levels for different times of day. Most even allow you to set a different program for weekdays, and weekends. For example, if you go to bed at 10 p.m., you can program your furnace to automatically cut back to a lower temperature at that time. If you wake up at 6:30 a.m., you can program the system to increase again at 6 a.m., and then go back down when you leave for work. With an energy savings of approximately 10 percent – one percent for every degree you set your furnace back – a $35 to $75 programmable thermostat can pay for itself in as little as two years.

Your clock-programmable thermostat also works with your central air conditioning system to save energy during the cooling season as well!

Central vs. zoned systems

Another consideration for heating your home is where you want the warmed air to go. Heating systems can be grouped into one of two categories: central and zoned.

Central heating systems, which include furnaces, boilers and electric heat pumps, use a blower and ductwork or pipes and radiators to circulate air throughout your entire home. When properly balanced, every room in the home is heated to the same temperature, which is controlled by a single thermostat. The presence of ductwork allows for the added comfort of a central air conditioning system as well.

In contrast, a zoned system has multiple thermostats spaced throughout the home, allowing you to adjust the temperature in different areas. Electric baseboard heaters and radiant heating panels are examples of zoned heating. Traditional zoned systems like these have the disadvantage of having no ductwork, and therefore no capability to use central air conditioning.

If you have a large home with rooms you rarely use, such as guest bedrooms, a zoned system will allow you to shut off the heat in that area – a practice not recommended for central heating systems. Zoned heating is also a plus if you and other family members disagree about the most comfortable temperature.

If you'd like the versatility of a zoned system with the energy efficiency and year-round comfort of a central system, ask your dealer about the zoned systems for forced-air furnaces and heat

pumps. Different areas of your home, such as the kitchen and family room, bedrooms and basement, are designated as individual zones all controlled by a central thermostat. The furnace will be specially designed and sized to accommodate the temperature changes in each area. Adding a zoned thermostat system to a high-efficiency natural gas furnace can help you save an additional 10-15 percent on your heating costs.

If you have zoned heating, turn the thermostats down or off in rooms that aren't being used. If you have central heating, do *not* close off registers in uninhabited areas – your system was designed to heat a specific square footage of living space and will continue working at the same pace. Blocking off registers also reduces the air flow through the furnace making it run hotter with much of this excess heat being lost. It can also damage or reduce the life of your furnace.

Maintaining your furnace

Change filters monthly

Checking your furnace's air filter monthly is one of the best defenses against costly repair bills. Failure to replace a dirty filter allows dust and dirt to work their way into the blower and coil assemblies, reducing the furnace's operating efficiency and eventually damaging the motor. Heating contractors say simple dust and dirt are the cause of almost half of their service calls.

Be aware that all air filters are not created equal! Use the type of filter

recommended by your furnace manufacturer or heating contractor. Dust and dirt can work their way into the blower and coil assemblies, reducing the furnace's operating efficiency and eventually causing damage to the motor.

Tune up annually

An annual service checkup by a heating professional is generally a good idea – no matter what fuel you use. The technician will check the flues and temperature settings, examine the heat exchanger for cracks, and check the safety mechanisms. An annual tune-up could cost from $65-200 depending on your unite but it can reduce your heating unit's operating cost by three to four percent. It can also identify potential problems that can be corrected then instead of with a service call in the middle of the coldest night of the year.

Beware of carbon monoxide

Every home with fuel-burning appliances should be equipped with carbon monoxide (CO) detectors. Similar to smoke detectors, these electronic alarms alert you to dangerous levels of CO. Carbon monoxide is about the same weight as air and will be distributed by air currents throughout your home, so install a detector on every level.

A properly functioning gas appliance produces harmless water vapor and carbon dioxide, which are vented out of the house. But if a heat exchanger is cracked, a flue pipe is plugged or if the furnace doesn't have an adequate amount of oxygen, the natural gas won't combust properly, creating deadly carbon monoxide (CO).

When this colorless, odorless, tasteless gas is inhaled, it enters the bloodstream and robs blood cells of oxygen. The symptoms of carbon monoxide poisoning mimic the flu –nausea, headaches, dizziness, fatigue – and long-term exposure can be fatal. CO poisoning can come on slowly causing unconsciousness so it is important to place CO detectors near bedrooms and living areas. The alarm should wake or alert you before dangerous levels of CO develop.

A word about wood-burning fireplaces

If you love to cozy up to a warm fire during cold winter nights, make sure you're not letting energy escape out the chimney along with the smoke. A wood-burning fireplace is one of the most inefficient ways to heat a room.

Here's why: hot air rises, so the majority of the air warmed by the fire goes up the chimney

– only a small percentage finds its way into the room. The warm air leaving the room is replaced by cold air from other areas of the house. If your furnace or other heating system is running while the fireplace is going, you're consuming energy to heat air that's being drawn into the fireplace and right up the chimney.

If you can't bear to give up your wood-burning fireplace, follow these tips to reduce your energy loss:

- Keep the damper closed whenever the fireplace isn't being used – leaving a damper open is the equivalent of keeping a two-foot-square window wide open.
- Check the seal on the damper by closing it off and holding a piece of tissue paper inside the firebox. If drafts blow the tissue paper around, repair or replace the damper.
- When using the fireplace, turn down the furnace to 50-55 degrees, close doors leading into the room, and open one window a crack to allow air to circulate.
- Tight-fitting glass doors can reduce the amount of air escaping out the chimney, and they also improve the combustion efficiency while the fire is going.
- Add caulking around the fireplace hearth.
- Have your chimney cleaned annually by a professional. Failure to do so may result in a chimney fire and even complete loss of your home.
- If you have a fireplace you never use – plug the chimney with insulation, install tight-fitting glass doors and seal them with caulk.

Natural gas fireplaces

Many homeowners are enjoying the comfort of a fire without logs or matches. Natural gas fireplaces are less expensive to operate, easier to start and maintain and burn clean to greatly reduce the amount of pollutants emitted into the air.

Newer gas fireplaces have realistic ceramic logs and can produce a yellow flame, rather than blue, and most models turn on and off with the push of a button or the flip of a switch. Some even have remote controls. Because a modern gas fireplace produces no smoke, fewer sparks and no ashes, a drafty chimney isn't needed – waste gases are vented through a small pipe to the outside wall, similar to a dryer vent.

It all adds up

Whether replacing your heating system or making the most energy-efficient use of your current one, conservation, safety and maintenance are all a part of the equation when it comes to getting the most value for your energy dollar.

If you'd like to learn more, call 1-800-ALLIANT or visit our Web site at *www.powerhousetv.com* to check out other *PowerHouse* brochures:

- 101 Easy Ways to Save Energy
- Appliance Operating Costs
- Choosing & Using Appliances
- Cooling Your Home
- Electrical Safety
- Energy-Efficient Landscaping
- Green Power
- Holiday Decorating Safety
- Insulating Your Home
- Lighting Your Home
- Natural Gas Safety
- New Home Construction
- Power Quality and Surge Protection
- Weathering the Storm
- Weatherizing Your Home

You can also find great energy efficiency and safety tips on our Web site at *www.alliantenergy.com.*

For more information on cash rebates and energy efficiency programs call 1-800-723-7635.

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