

SAVE MONEY ■ SAVE TIME ■ SAVE ENERGY

Cooling your home



PowerHouse

Presented by  **ALLIANT
ENERGY**

How air conditioning helps you keep your cool



Did you know the human comfort range in summer is between 72°F and 78°F with relative humidity between 35 and 60 percent, according to the American Society for Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Throughout the upper Midwest, achieving this “comfort zone” generally involves air conditioning, at least during the hottest part of the summer. Using a properly sized, high-efficiency air conditioner, and implementing

measures to reduce your air conditioning needs can increase your comfort, plus reduce your air conditioning use by 20 to 50 percent!

There are many factors to consider when cooling your home. In this brochure, you’ll find great tips on:

- Repairing vs. replacing an older unit
- Choosing the correct air conditioner
- Using your cooling system efficiently
- Maintaining your air conditioner
- Cooling without an air conditioner

Read on to learn more about keeping your cool – and your cash!

Reducing energy consumption helps reduce the need to build new power plants, keeps your costs in check and preserves precious natural resources.

Spending wisely: repair or replace?

The average home air conditioning system has a life expectancy of 10 to 15 years, depending on how often it's used and how well it's maintained. Though it might initially seem less expensive to repair a faulty or aging air conditioner, before you do, consider the long-term costs. A unit manufactured more than 10 years ago could use up to twice the energy of a new model. You could save enough on your electric bill to pay for the new unit in as little as two years! An added benefit is new units use a more environmentally-friendly refrigerant than older models.

A new, energy-efficient air conditioner can pay for itself in as little as two years.

Choosing the air conditioner that's right for you

The most common types of air conditioners for Midwest climates are room air conditioners, central air conditioners, and geothermal heat pumps.

Room air conditioners are a good choice for smaller homes, or for those with modest cooling needs. They are available in window, or wall-mounted varieties. As an example, if yours is a two-person household where no one is home most of the day, using a room air conditioner to cool the bedroom at night might be your most energy-efficient option.



Central air conditioners generally use the same ductwork as your furnace, if you have an existing forced-air heating system.

The compressor unit is located outside your home, so it is often quieter than a room air conditioner. Central air

conditioners are sometimes referred to as whole-house units, as they provide cooling throughout your home. Central air is a logical choice for a busy home with multiple occupants.

Geothermal heat pumps are similar to central air conditioners, except that the cycle can be reversed and used for heating during the winter months. Heat pump systems are most often installed when building a new home, or replacing both a heating and air conditioning system. They are the most efficient cooling systems currently available.



What size air conditioner do you need?

No matter what type air conditioner you select, it must be properly sized for your home. Contrary to popular belief, an oversized system is not a good value. In addition to the initially higher cost, an oversized unit will cycle on and off more frequently. This uses more energy than continuous operation, just as a car uses more fuel in stop-and-go traffic than on the highway. Because it runs for a longer period of time, a slightly undersized unit will also do a better job of dehumidifying the air.

The U.S. Department of Energy suggests thinking of an appliance purchase like buying a car or even a home. The purchase price is the down payment; the energy use is the interest rate. The lower the energy consumption, the lower the total cost of owning the appliance.

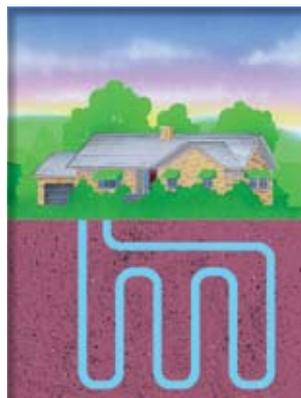
Central air conditioner unit efficiency ratings

A central air conditioner's energy efficiency is measured by a seasonal energy efficiency ratio (SEER). Many older central air systems have a SEER rating of only seven or eight, while a rating of 12 is now considered the minimum for new systems. A SEER of 13 or higher is necessary for a unit to earn the ENERGY STAR label. If you decide to replace an older unit with a 13 SEER model, you can expect to reduce your energy usage by at least one-third. Ask your dealer to estimate how much you can save.

Geothermal: Cooling and heating with the earth's own energy

Geothermal systems, sometimes known as ground source heat pumps (GSHPs), are electrically powered systems that tap the stored energy of the greatest solar collector in existence: the earth. These systems use the earth's relatively constant temperature to provide cooling and heating for homes and commercial buildings.

When compared to conventional systems, a geothermal system saves homeowners 30 to 70 percent in heating costs, and another 20 to 50 percent in cooling expenses, according to the Environmental Protection Agency (EPA).



Frequent on-off cycles use more energy than continuous operation, just as a car uses more fuel in stop-and-go traffic than on the highway.

During the summer, the unit extracts heat from your home and transfers it back to the circulating liquid in the underground loop system, where it is transferred into the cooler earth. During the winter, liquid circulating through

the underground loop system absorbs heat from the earth and carries it to the geothermal unit which extracts the heat and then enhances the heat to a higher temperature and distributes it throughout the home.

A GSHP system can be installed in a home of any size, almost anywhere, but is most often incorporated into new home construction. An existing house can be retrofitted with a GSHP, often using the ductwork that is already there.

Installing a new air conditioner

Even after you've chosen your properly-sized, energy-efficient air conditioner, there are additional factors that can affect how much energy your system uses.



- **Location:** Installing the outdoor compressor in a shady spot can help reduce energy use by up to 10 percent. Be sure to maintain at least a one-foot air flow around the entire unit. Room air conditioners should also be installed in a shady area.
- **Insulation:** Attic insulation plays a critical role in air conditioning efficiency. If your attic insulation is R-38 (approximately 15 inches) or less, it's definitely worth the investment to upgrade.

■ **Weatherizing:** Don't let the cooled air escape from your home through holes and cracks. These easy weatherizing tasks can significantly reduce cooling loss:

- Caulk around the exteriors of all windows and doors, and around all other openings like dryer vents and sump pump pipes.
- Use weatherstripping on all doors.
- Install safety caps in all outlets and foam gaskets behind switchplate covers.

Operating tips

Your air conditioner will run most efficiently if you know how to effectively use the thermostat:

- Set the thermostat for a temperature that's comfortable for you and *leave it there*. Lowering the thermostat several degrees will not cool your home more quickly, and frequent changes force the system to turn on and off more often.
- Invest in a programmable thermostat. You can program the system to raise the thermostat a few degrees when you leave in the morning, and lower it again a short while before you come home.
- Set the fan to "on" rather than "auto." The fan will keep the air circulating throughout the home continuously, while the cooling unit will cycle on and off just as it usually does. This will help maintain an even temperature throughout the house.



- Consider a “zoned” system if you only use areas of your house during certain times. For example, you can just cool your bedrooms at night and the rest of the house will not be air conditioned until the daytime – like a programmable thermostat, it works with your heating system too.

Maintaining your cooling system

With proper maintenance, your air conditioner should last about 15 years. You can keep your system running efficiently with these easy maintenance tasks:

- Clean the outside compressor by spraying it with a hose. (turn off the power first).
- Clean the filter on room air conditioners as necessary, but at least monthly.
- Keep plantings at least one foot away from the compressor unit for adequate air flow.
- Change the furnace filter at least every other month.
- Make sure your unit is properly charged with refrigerant. A system that is 20 percent undercharged will operate at 20 percent lower efficiency.



- Confirm that duct work is properly sealed. Properly sealed duct work can reduce cooling energy use by 10-15 percent.
- Vacuum registers and return air vents regularly.
- Have your ductwork cleaned professionally every few years, especially if you have pets.
- Keep furniture and drapes away from registers.
- During the winter remove window air conditioning units.

Boost your cooling power with a ceiling fan

With a ceiling fan operating at low speed in addition to your air conditioning, you'll feel just as comfortable at 82 degrees as you would at 78 degrees without the fan! Creating a modest breeze of 2.5 ft/sec or 1.7 mph will extend your comfort zone from 78 to 82 degrees. A ceiling fan operating on low speed can easily provide this air movement. What's more, you save three to five percent on air conditioning costs for each degree you raise your thermostat!



Room area (square feet)	Fan diameter (inches)
100	36
150	42
225	48
378	52
Over 400	2 fans

Match the size of the ceiling fan to the size of the room. Larger fans move more air than smaller fans. A 36- or 44-inch diameter fan will cool a room up to 225 square feet. A 52-inch diameter fan will handle larger rooms.

Ceiling fans cool people, not rooms. If the room is unoccupied, turn off the ceiling fan to save energy.

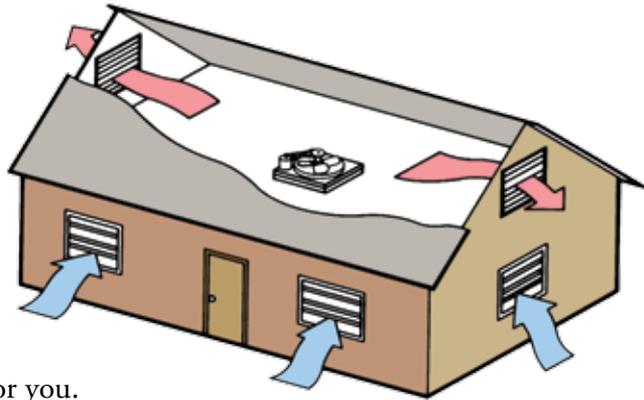
In the summer, adjust your ceiling fan so air is directed downward. The airflow produced by the ceiling fan creates a wind-chill effect, making you “feel” cooler. And remember; *turn the ceiling fan off when not in the room.*

Ceiling fans cool people, not rooms. If the room is unoccupied, turn off the ceiling fan to save energy.

Whole house fans get the heat out

Whole house fans are most effective when the outdoor temperature has dropped about three degrees below the indoor temperature. Mounted in a hallway ceiling on the uppermost floor, the whole house fan sucks the hot air out of the house and blows it into the attic in a matter of minutes, while drawing cooler outdoor air in through open windows.

Proper attic insulation and ventilation are essential when installing a whole house unit, as well as proper sizing and installation. Contact a reputable heating and cooling professional to determine what’s right for you.



Don't hesitate to ventilate: window, table, and floor fans

Portable fans help to increase an existing breeze, or create one when none is present. Costs can vary from as little as \$10 to over \$200. You may choose to pay a little more to get a quieter fan.

Fan noise is rated in *sones*. A quiet fan will have a noise rating of 1.5 sones or less. A fan with a sone rating of 4 or greater will be quite noisy. If possible, listen to the fan in operation before purchasing.

A small table fan near you will create a wind chill effect and make you more comfortable.

Window or box fans placed in an open window will aid in removing warm air from your home, and bringing in fresh, cool air from outside when the outside air temperature is lower than the temperature inside.

The most efficient set up is to place a fan in a window on the downwind side of your house. (So if the wind is blowing from the north, place the fan in a south window of your house). Place the fan so that it blows air *out* of the house. Confirm that there is an open window on the opposite side of the house. The fan will draw cool air in through the open window to replace the warm air you are blowing out.

Make certain any fan placed in a window is secure. A poorly secured fan can easily vibrate against the window frame making it noisier, and creating a safety hazard if it should fall out of the window.



When selecting placement for window fans, remember that if you force the air to take a longer path between where it enters and leaves your home, it will have a greater cooling effect. Using a smaller window for the inlet and larger window for the outlet will also increase air speed and improve the cooling effect.

Experiment with different combinations of window venting to achieve maximum cooling. This may require leaving some windows closed to create a longer path for air movement.

Cooling without an air conditioner

Before you reach for the thermostat, look around your home for other ways to beat the heat. Some are simple, others are long-term ideas, but they can help you reduce your cooling costs.

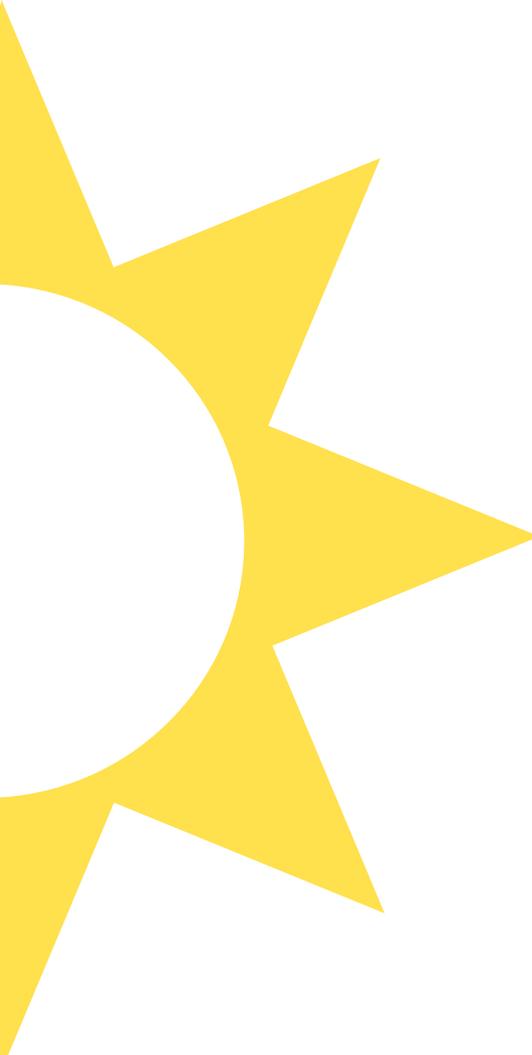


- **Landscaping:** A well-placed shade tree is an excellent cooling investment — it can cut your energy consumption by 25 percent. General guidelines are to plant deciduous (leafy trees like oaks and maples) to the south and west, and evergreens to the north. For additional information, talk to your local tree nursery or a community forester.
- Shade south- and west-facing windows with blinds, drapes or other coverings during the hottest parts of the day.
- Turn off unnecessary lighting, and wait to use heat-producing appliances like ovens, dishwashers and clothes dryers until late evening.

If you'd like to learn more, call 1-800-ALLIANT (255-4268) 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
- Electrical Safety
- Energy-Efficient Landscaping
- Green Power
- Heating Your Home
- 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.alliant-energy.com.



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