

# *Electric Heating* Today

A special publication of Minnkota Power Cooperative and the associated systems



Geothermal captures  
the earth's free heat

Off-peak electric  
heating options

Comparing energy  
costs for heating





# *Bring warmth and comfort to your home* **with electric heat**

**E**lectricity – it's one of the most dependable, stable and versatile energy sources available today. It can economically heat your home, warm your water, cool your food, brighten up the dark, power your electronics and secure your family.

Electricity from your local electric cooperatives and municipals comes with the added benefits of member-owned service. Members like you own and control their electric utility.

So whether you are looking for increased comfort, higher efficiency, greater reliability or more choices, consider the value of electricity

from your electric cooperative or municipal. Providing you service, peace of mind and savings – each and every day.

Take a look at these proven benefits of electric heat – positive strengths that will give you the highest value for your heating dollar.

## **Electric heat is:**

**Clean** – Electric heating systems operate cleanly with no fuel storage or messy ashes to haul out.

**Efficient** – Electricity is 100 percent efficient, which means you get value from every kilowatt-hour (kWh) purchased.

**Reliable** – Your electricity is generated from a combination of North Dakota lignite coal, wind and hydropower resources. It is available almost every hour of every day.

**Versatile** – There are a wide variety of electric heating systems that can fit any home.

**Affordable** – Your cooperative or municipal works hard to offer stable electric rates and save you money through the off-peak electric heating program.

# The off-peak *advantage*

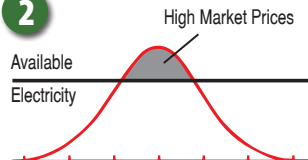
*You can enjoy the convenience of electric heat and save money, too, by installing off-peak electric heating in your new or existing home. An off-peak electric heating system consists of electric heat as its main heating source with a supplemental heating system that will typically operate 200-400 hours per year during times of peak electrical usage.*

1



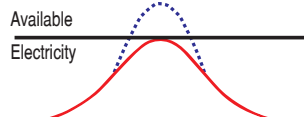
Home uses electric heat at lower off-peak rate under normal conditions.

2



Electricity demand exceeds current power supply and economical energy purchases are not available.

3



Load control is used to avoid uneconomical energy purchases and maintain system reliability.

4



Home is automatically switched from electric to backup heating source. No change in comfort should be noticed between the two systems.

## Off-peak electric heat saves you money

Off-peak electric heating makes good sense because the cooperative or municipal that provides your electric service offers a low off-peak rate. This off-peak rate is about half the regular rate for electric service.

With the off-peak rate, electricity is very competitive with other heating fuels such as propane or fuel oil. And the low off-peak rate really looks good during those times when fossil fuel prices rise dramatically.

## Many options available

A home with an existing fossil fuel heating system can be converted to off-peak electric heating very easily. Qualified personnel from your cooperative or municipal utility will be happy to advise you on the best electric alternative to meet your specific needs.

Savings from an off-peak electric heating system can often pay for the cost of the system within five years.

Installation of your off-peak electric heating system is done by a qualified heating contractor of your choice. Your local cooperative or municipal will install an off-peak electric meter and provide a ripple control device that will automatically switch your heating system from the electric mode to the backup system.

## Automatic convenience

Your off-peak system is activated by a special code, which is sent via a high-frequency electrical impulse called a ripple signal. The signal is sent from the Minnkota Control Center in Grand Forks, N.D., to your home or business over existing electric lines.

A ripple control device automatically turns off your electric heating system and activates your backup heating system at the start

of the peak control period. The process is reversed when the peak time is over.

A reliable backup heating system is essential, as control times for the winter heating season can be expected.

## Ultimate energy conservation tool

Off-peak heating systems are controlled during periods of peak electrical usage in the region — usually the coldest days of winter. Load management may also be influenced by the availability and price of electric energy in the wholesale marketplace.

The ability to interrupt the flow of electricity to the electric portion of the off-peak systems allows Minnkota to operate its generating plants more efficiently and avoid costly power pool purchases. These savings are passed on to customers through the low off-peak electric rate.





**In a dual fuel system, electricity is the primary heating source during normal off-peak conditions. A non-electric backup system supplies heat during energy control periods.**

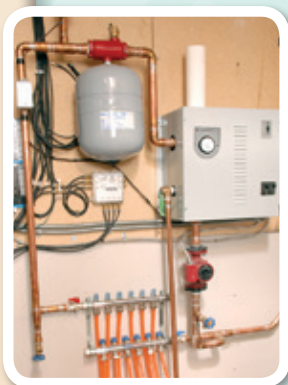
## Mike and Kristine Adams

When Mike and Kristine Adams decided to retire, they began plans to build a new home on a lake near Bemidji, Minn. With a new construction project, the heating system options were endless. The Beltrami Electric Cooperative members chose radiant ceiling panels and underfloor storage heat with a gas furnace as a backup source, which qualifies for the off-peak electric heating program. They enjoy the system because it operates quietly, cleanly and efficiently, while providing consistent comfort. Another popular feature of the system is that it is entirely hidden. The floor heat panels are below the concrete slab, while the ceiling panels are above the sheetrock. Programmable thermostats control the temperature. The home was designed around the heating system so that it would be a warm, comfortable place for family and friends to gather. There are special areas set aside for their favorite guests: the grandkids. "We're always ready for the grandkids to come over," Kristine said.



*"There's no air movement. There's no fan running. It's a nice, consistent heat."*

**- Mike Adams**  
Bemidji, Minn.



## Electric Boiler

*An electric boiler uses heating elements to warm water, which is then circulated to transfer heat throughout a home. It can be used in combination with an existing fossil fuel boiler. In new installations, electric boilers can be used for quality radiant floor heating.*

### Benefits

- Adding an electric boiler to an existing hot water heating system is relatively easy.
- Electric boilers are compact in size and can fit any home.

### Applications

- An electric boiler can be installed with a wide variety of underfloor hydronic heating systems.
- Electric boilers are compatible with hot water baseboard and radiator heat systems.



# Electric Plenum Heater

*An electric plenum heater is one of the most common off-peak electric heating systems available today. Easily adapted to an existing oil or gas forced-air system, a plenum heater uses your existing furnace fan to move air across the plenum heater elements to heat your home. Both your fossil fuel furnace and the electric plenum heater use the same thermostat and ductwork.*

## Benefits

- An electric plenum heater is one of the easiest and most cost-effective options to convert your existing propane or oil furnace into a dual fuel heating system.
- The plenum heater is a safe and clean heating alternative for a home or building.
- The addition of a plenum heater enhances your gas furnace, which can help your furnace's lifespan.



## Applications

- A plenum heating system is available in both upflow and downflow configurations.
- In most cases, a plenum heater can be installed in conjunction with a central air conditioning system or an air-source heat pump.



# Zone Heating Options

## Electric baseboard

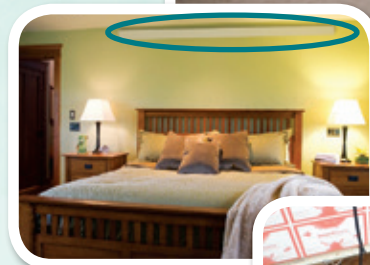
This versatile option uses electric resistance heating and can be used in almost any heating application. Electric baseboards have the advantage of individual room control for heating only the areas you use and require no ducts. The units are clean, safe, easy to maintain and have a long life.

## Cove heating

This system uses radiant heat to warm a room or area and the objects and people in that space. Cove heating units are mounted near the ceiling so that the radiant panels direct heat downward across the room, without being blocked by furniture and other objects. Radiant heat warms people directly, creating comfort conditions similar to that of the sun.

## Ceiling heat

Ceiling heat can be installed by using either electric cable or radiant ceiling panels. This type of heat warms objects and people in the room instead of heating the air, providing a clean, safe and quiet form of heat.





# Storage Heating

## Russ and Carol Okeson

In 2004, Russ and Carol Okeson installed an electric thermal storage furnace in their home near Detroit Lakes, Minn. More than a decade later, the system is still keeping their home warm and their energy bill affordable. "We've had no issues. It's worked flawlessly," Russ said. "We have done zero maintenance on this system besides changing out the air filters." The Okesons, Wild Rice Electric members, like the system because they can enjoy the benefits of off-peak electric heating without the need of a backup heating system. Heat is stored for extended periods in high-density ceramic bricks. During control periods that heat is released, keeping the home cozy and comfortable. "We're able to enjoy the benefits of the best off-peak heating rates because of the fact it can be controlled," Russ said. Carol added, "I never even notice when we're being controlled."



*"We have done zero maintenance on this system besides changing out the air filters."*

**- Russ Okeson**  
Detroit Lakes, Minn.



## Electric thermal storage heaters

*Electric thermal storage heaters convert off-peak electricity to heat and store this low-cost heat for use in satisfying the comfort requirements of a home 24 hours a day. The system contains electric heating elements that lie within specially designed, high-density ceramic bricks. These bricks are capable of storing vast amounts of heat for extended periods of time. The stored heat is automatically regulated in relation to outdoor temperature and the heating requirements of the user. When the room thermostat calls for heat, heat is extracted from the unit's storage core and is distributed evenly in the home.*

### Benefits

- An electric thermal storage heater's ability to store off-peak energy and efficiently deliver heat makes this one of the most advanced heating systems available today.
- The system is clean and 100 percent efficient.
- Electric outdoor sensors maintain the correct amount of stored heat throughout each season, creating year-round comfort.



## Applications

### Central forced-air furnace

The forced-air furnace uses existing ductwork and is designed to be the sole heating system in a home. The unit is configured with a variable speed blower to provide extra comfort as well as added cost savings.



### Hydronic furnace

The hydronic furnace uses a heat exchanger to transfer heat as needed from the storage media to a liquid solution, which is circulated to areas where heat is needed. The system is extremely flexible and can be used in underfloor heating, baseboard, forced-air or any combination of zone delivery systems.



### Room units

The room unit is an economical and efficient option for homes without existing ductwork. This system is designed to heat an individual room or area. It can be used in new homes but is more often used to supplement an existing heating system or a cold spot in the home.



## Underfloor storage heaters

*Underfloor storage heaters are buried in a sandbed beneath the concrete slab. The sand and slab serve as storage agents when warmed, emitting heat into the room.*

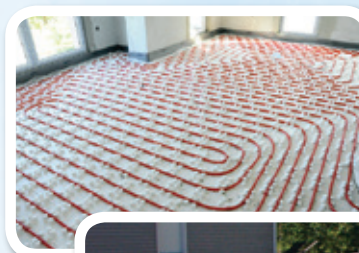
### Benefits

- Underfloor heat transfers consistently across the floor to reach people and objects, providing both comfort and efficiency.
- A thermal storage system can heat an entire building or may be used to supplement another heat source.
- Place your furniture wherever you choose. Vents do not get in the way.
- The system is clean and quiet.

## Applications

### Hydronic tubing

Used in conjunction with an electric boiler, hydronic floor heating is a system of circulating heated water through flexible piping. The piping can be installed right below the concrete in new construction projects or mounted below the floor of existing wood construction.



### Electric cable or mats

Electric cables or mats heat up when electric current is applied. The systems are buried 8 to 12 inches deep in a bed of sand under the concrete slab, which serves as a heat storage reservoir.





# Air-source heat *Pump*

## Brayden and Mary Beth Wagner

When Brayden Wagner moved back to his family's farm near Englevale, N.D., he and his wife, Mary Beth, wanted to make their first house feel like home. That meant a full-scale remodeling project and a new heating system for those cold nights out on the prairie. After consulting with a contractor, the Wagners decided that an air-source heat pump with an electric plenum would provide the best long-term value. "We're the fifth generation to live on this farm and we plan to be out here the rest of our lives," Brayden said. "It only made sense to upgrade to a system that's going to provide the most comfort and efficiency over the long run." As Cass County Electric Cooperative members, the Wagners were also able to take advantage of significant cost savings by backing their electric system with a propane furnace and signing up for the off-peak program.



*"We're the fifth generation to live on this farm and we plan to be out here the rest of our lives. It only made sense to upgrade to a system that's going to provide the most comfort and efficiency over the long run."*

**- Brayden Wagner**  
Englevale, N.D.



## How does it work?

*Unlike a furnace, an air-source heat pump doesn't burn fuel to make heat. It simply uses electricity to move heat from one place to another. Think of an air-source heat pump as a heat transporter constantly moving warm air from one place to another, to where it's needed or not needed, depending on the season. Even cold winter air contains some heat. When it's cold outside, a heat pump extracts this outside heat and transfers it inside. When it's warm outside, it reverses directions and acts like an air conditioner, removing heat from your home.*



## Benefits

- A single system heats your home in the winter and cools your home in the summer.
- Air-source heat pumps are energy-efficient because they move heat instead of generating it. The system delivers up to three times more energy than the electricity it consumes.
- Air-source heat pumps are typically simple to install and require little maintenance.

## Applications

### Standard air-source heat pump

A standard air-source heat pump is a self-contained unit that uses existing ductwork to both heat and cool. The system has two main components: an outdoor compressor unit and an indoor air handling unit. The two units are linked with refrigerant tubing and a connected electric supply wire.



### Ductless mini-split heat pump

A mini-split heat pump is an economical and efficient option for homes without an existing ducted system or when adding ductwork may be impractical or too expensive. Similar to a standard air-source heat pump, a compressor unit is placed outside your home and is connected to an indoor unit by small cables and a refrigerant line. The indoor unit is typically mounted high on the wall of the room and can be pre-set to run automatically or be adjusted by a remote control.

Mini-split heat pumps are popular for homes without existing ductwork. The indoor units are positioned high on the wall and come in a variety of designs to match your existing decor.





# Geothermal heat Pump

## Steve and Marie Goodwin



*"It's clean and comfortable. I like that I don't have to worry about switching the temperatures back and forth. The system runs itself."*

**- Marie Goodwin**  
Angus, Minn.

When it came time to replace their aging propane heating system, Steve and Marie Goodwin began searching for the most energy-efficient replacement. After discussing the project with PKM Electric Cooperative, the couple decided on a geothermal system. "You can listen to a salesman, but it means a lot more when it comes from your cooperative because you know they're looking out for your best interests," Steve said. Although there is a higher upfront cost, the efficiency of the system has greatly reduced the home's energy bills. "It's clean and comfortable," Marie said. "I like that I don't have to worry about switching the temperatures back and forth. The system runs itself." The couple was so pleased with their decision, they chose to add a second geothermal system in their new farm equipment shop.

## Capture the earth's free heat with a geothermal system

A geothermal heating and cooling system — also known as a ground-source heat pump — has by far the highest efficiency for the combination of space heating and cooling of any other system on the market today. The reason for this efficiency advantage is simple: geothermal systems do not consume fuel to produce heat. Instead, they capture some of the virtually limitless heat constantly available a few feet below the surface of the earth.





# How does it work?

*Geothermal heating is based on the physical law that energy flows from a warmer place to a cooler place. The typical geothermal system consists of a closed loop of special plastic tubing installed underground and an electrically powered compressor inside the home or other structure. An environmentally friendly, biodegradable antifreeze solution is circulated through the tubing.*

*The earth is a wonderful source of heat. During the heating season, the ground, at a temperature of 45 to 50 degrees Fahrenheit, transfers heat to the cooler solution in the tubing. The warmed solution is then conveyed to the compressor, which removes the heat and discharges it into the home. The reverse occurs during the cooling season.*



## Benefits

- Because electric energy is used only to move much larger amounts of heat energy, a geothermal heat pump system is very efficient. It uses 25 to 50 percent less electricity than conventional heating or cooling systems, according to the U.S. Department of Energy.
- Because they use fewer mechanical components, and because those components are sheltered from the elements, geothermal heat pumps are durable and highly reliable. The underground piping used in the system often has 25- to 50-year warranties, and the heat pumps generally last 20 years or more.
- When properly installed, the underground components are virtually worry-free. The components in the living space are easily accessible, which increases the convenience factor and helps ensure that the upkeep is done on a timely basis.
- Geothermal heat pumps use no outside condensing units, so there's no noise or humming to bother either you or your neighbors.
- For water heating, you can add a desuperheater to a geothermal system. A desuperheater is a small heat exchanger that takes heat from the unit's compressor to warm water. This hot water then circulates through a pipe to the home's storage water heater tank.

## Applications

### Closed-loop systems

#### Horizontal

This type of installation is generally most cost-effective for residential installations, particularly for new construction where sufficient land is available. It requires trenches at least four feet deep.

#### Vertical

This is often used for larger scale geothermal systems (such as in commercial buildings) where land is limited, or where the soil is too shallow to bury the horizontal loops in the trenches and some form of drilling into the bedrock is necessary. Vertical loop systems can be more expensive, but they use less land and also minimize disturbance to the existing landscape.

#### Pond/Lake

If the site has an adequate water body, this may be an economical option. A supply line pipe runs underground

from the building to the water and coils into circles at least eight feet under the surface to prevent freezing. The coils should only be placed in a water source that meets minimum volume, depth and quality criteria.

### Open-loop system

This type of system uses well or surface body water as the heat exchange fluid that circulates directly through the geothermal heat pump system. Once it has circulated through the system, the water returns to the ground through the well. This option is practical only with an adequate supply of relatively clean water, and if all local codes and regulations regarding groundwater discharge are met.



# How to compare cost

When comparing the price of off-peak electricity for heating to the price of alternative heating fuels, it is important to compare equipment efficiency, energy rates and monthly service charges.

The seasonal efficiency for electric heating systems ranges from 100-300 percent or more. The comparable efficiency for gas and oil heating systems ranges from a low of approximately 70 percent to a high of 95 percent. Older gas and oil systems have an efficiency of 70 to 80 percent and most newer models have an efficiency in the 90 percent range.

Cost comparisons must also take into account actual energy cost and facilities charges or service charges that often are required by utilities.

An energy specialist from your local cooperative or municipal will be happy to help you sort out all the factors that should be considered in your energy cost comparisons.

## Assumptions

Fuel Source	Btu Heat Content	Annual Seasonal Operating Efficiency
Electricity - Standard Resistance	3,413 Btu/kWh	100%
Air-Source Heat Pump (ASHP) combined with Modulating Supplemental Electric Heat @ 200% Efficiency	3,413 Btu/kWh	200%
Ground-Source Heat Pump (GSHP)	3,413 Btu/kWh	330%
#2 Fuel Oil	140,000 Btu/gallon	80%
Propane	91,600 Btu/gallon	90%
Natural Gas	100,000 Btu/therm	90%

## Standard Resistance Electric Heat @ 100% Efficiency

Electric (\$/kWh) 100% Efficiency	Propane (\$/Gallon) 90% Efficiency	Fuel Oil (\$/Gallon) 80% Efficiency	Natural Gas (\$/Therm) 90% Efficiency
0.05	1.21	1.64	1.32
0.052	1.26	1.71	1.37
0.054	1.30	1.77	1.42
0.056	1.35	1.84	1.48
0.058	1.40	1.90	1.53
0.06	1.45	1.97	1.58
0.062	1.50	2.03	1.63
0.064	1.55	2.10	1.69
0.066	1.59	2.17	1.74
0.068	1.64	2.23	1.79
0.07	1.69	2.30	1.85
0.072	1.74	2.36	1.90
0.074	1.79	2.43	1.95
0.076	1.84	2.49	2.00
0.078	1.88	2.56	2.06
0.08	1.93	2.63	2.11
0.082	1.98	2.69	2.16
0.084	2.03	2.76	2.22
0.086	2.08	2.82	2.27
0.088	2.13	2.89	2.32
0.09	2.17	2.95	2.37
0.095	2.29	3.12	2.51
0.10	2.42	3.28	2.64
0.105	2.54	3.45	2.77
0.11	2.66	3.61	2.90
0.115	2.78	3.77	3.03
0.12	2.90	3.94	3.16
0.125	3.02	4.10	3.30
0.13	3.14	4.27	3.43
0.135	3.26	4.43	3.56
0.14	3.38	4.59	3.69
0.145	3.50	4.76	3.82

The above figures are based on the assumptions and formulas listed below.

## Formulas

### Alternate fuel price to electric rate conversion formula:

$$(\text{Alternate Fuel Price} \div \text{Efficiency}) \times (3,413 \times \text{Efficiency}) \div \text{Alternate Fuel Btu Heat Content} = \text{Electric Rate}$$

Example of \$.72/Gal. Propane @ 90% efficiency to ASHP with Modulating Supplemental Electric Heat @ 200% efficiency:

$$(.72 \div 90\%) \times (3,413 \times 200\%) \div 91,600 = \$0.06/\text{kWh}$$

### Electric rate to alternate fuel price conversion formula:

$$(\text{Electric Rate} \div \text{Efficiency}) \times (\text{Alternate Btu Heat Content} \times \text{Efficiency}) \div 3,413 = \text{Alternate Fuel Price}$$

Example of \$.06/kWh ASHP with Modulating Supplemental Electric Heat @ 200% efficiency to Propane @ 90% efficiency:

$$(.06 \div 200\%) \times (91,600 \times 90\%) \div 3,413 = \$0.72/\text{Gal.}$$



## Air-Source Heat Pump (ASHP) combined with Modulating Supplemental Electric Heat @ 200% Efficiency

ASHP/Supp. (\$/kWh) 200% Efficiency	Propane (\$/Gallon) 90% Efficiency	Fuel Oil (\$/Gallon) 80% Efficiency	Natural Gas (\$/Therm) 90% Efficiency
0.05	0.60	0.82	0.66
0.052	0.63	0.85	0.69
0.054	0.65	0.89	0.71
0.056	0.68	0.92	0.74
0.058	0.70	0.95	0.76
0.06	0.72	0.98	0.79
0.062	0.75	1.02	0.82
0.064	0.77	1.05	0.84
0.066	0.80	1.08	0.87
0.068	0.82	1.12	0.90
0.07	0.85	1.15	0.92
0.072	0.87	1.18	0.95
0.074	0.89	1.21	0.98
0.076	0.92	1.25	1.00
0.078	0.94	1.28	1.03
0.08	0.97	1.31	1.05
0.082	0.99	1.35	1.08
0.084	1.01	1.38	1.11
0.086	1.04	1.41	1.13
0.088	1.06	1.44	1.16
0.09	1.09	1.48	1.19
0.095	1.15	1.56	1.25
0.10	1.21	1.64	1.32
0.105	1.27	1.72	1.38
0.11	1.33	1.80	1.45
0.115	1.39	1.89	1.52
0.12	1.45	1.97	1.58
0.125	1.51	2.05	1.65
0.13	1.57	2.13	1.71
0.135	1.63	2.22	1.78
0.14	1.69	2.30	1.85
0.145	1.75	2.38	1.91

The above figures are based on the assumptions and formulas listed on previous page.

## Ground-Source Heat Pump (GSHP) @ 330% Efficiency

GSHP (\$/kWh) 330% Efficiency	Propane (\$/Gallon) 90% Efficiency	Fuel Oil (\$/Gallon) 80% Efficiency	Natural Gas (\$/Therm) 90% Efficiency
0.05	0.37	0.50	0.40
0.052	0.38	0.52	0.42
0.054	0.40	0.54	0.43
0.056	0.41	0.56	0.45
0.058	0.42	0.58	0.46
0.06	0.44	0.60	0.48
0.062	0.45	0.62	0.50
0.064	0.47	0.64	0.51
0.066	0.48	0.66	0.53
0.068	0.50	0.68	0.54
0.07	0.51	0.70	0.56
0.072	0.53	0.72	0.58
0.074	0.54	0.74	0.59
0.076	0.56	0.76	0.61
0.078	0.57	0.78	0.62
0.08	0.59	0.80	0.64
0.082	0.60	0.82	0.66
0.084	0.61	0.84	0.67
0.086	0.63	0.86	0.69
0.088	0.64	0.88	0.70
0.09	0.66	0.89	0.72
0.095	0.70	0.94	0.76
0.10	0.73	0.99	0.80
0.105	0.77	1.04	0.84
0.11	0.81	1.09	0.88
0.115	0.84	1.14	0.92
0.12	0.88	1.19	0.96
0.125	0.91	1.24	1.00
0.13	0.95	1.29	1.04
0.135	0.99	1.34	1.08
0.14	1.02	1.39	1.12
0.145	1.06	1.44	1.16

The above figures are based on the assumptions and formulas listed on previous page.

## Save with a new water heater

About 20 percent of the energy used in your home is for water heating. And depending on the number and ages of people living in your home, the percentage could be greater.

You may be able to save money by replacing your old water heater with a high-efficiency electric model. If your water heater isn't highly efficient, you're probably wasting money, and you could be running out of hot water, too. Older models can be very inefficient because of poor insulation, corrosion and less efficient design. A new electric water heater will have sufficient insulation (at least two inches of foam for an R-16 insulation value) and can be selected with the corrosion protection that matches the quality of the water in your area.

New electric water heaters come with a choice of linings. Both glass and stone linings are excellent choices, but if you have particularly hard water, a polybutylene tank may be your best option.

Another option available is a heat trap. A heat trap keeps heated water in the tank during non-use time periods rather than letting it rise into the piping where it loses heat energy. A heat trap can increase water heating efficiency substantially. Call your power supplier for good advice and information on your water heating needs.





# What to ask your contractor when purchasing a residential heating or cooling system?

## **Does the company hold a heating, ventilation and air conditioning (HVAC) license?**

State licensing is the minimum requirement to operate a heating and air conditioning company. Licensing protects the public, including you. Unlicensed companies are unaccountable to regulators and often unavailable if things go wrong. Ask for a license number. It is the first step to knowing you are dealing with a reputable company.

## **Does the company employ NATE certified technicians?**

NATE is the North American Technician Excellence program. It is the heating and air conditioning industry's certification body for technical knowledge. NATE-certified technicians are the best trained and highest quality service and installation providers in the industry.



## **Is your company insured?**

Most companies will be insured, but not all are. Ask about Worker's Compensation and Liability Insurance. Using a licensed contractor will not only protect your investment, it will also protect you against liability issues. Don't take the risk. Ask about insurance.

## **How long has the company been in business (under the same name)?**

One in five heating and cooling companies goes out of business every year. The best way to predict whether a company will be around long enough to honor its warranty promise to you is whether the company had been around in the past. Most reputable companies state their business tenure. Beware of companies that have been around for only a short while, or close due to a poor reputation and reopen with a new name.





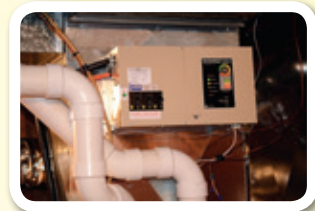
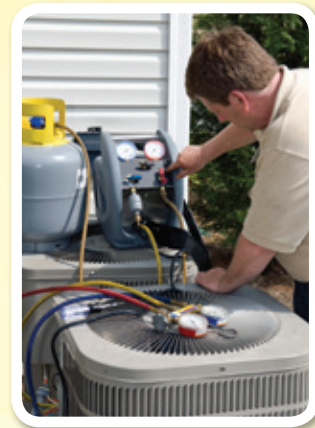
## What size HVAC do I need?

It is important for a contractor to properly size your heating and cooling equipment to the requirements of your home. This ensures that the equipment will perform properly under all conditions. It is especially important for air-source and ground-source heat pumps to be properly sized as they will switch to an alternative backup fuel under extremely cold conditions.

Operating on the usually less-efficient backup fuel starts to erode the cost savings and energy efficiency gains that are obtained by using a high efficiency air-source or ground-source heat pump.

However, if the unit is properly sized for these conditions, the backup fuel source will be used less frequently.

It is also important to consider the sizing of the ductwork. Ask your contractor about special sizing needed for ground-source heat pumps, which usually require larger ductwork because the delivery temperatures are lower than those of more conventional HVAC equipment. Inadequate ductwork will cause fans to work harder than necessary, waste energy and potentially not deliver the volume of air needed for a comfortable environment.



## Are there other energy-efficient options?



Quality contractors should be up on the latest energy-saving equipment options, including ENERGY STAR®. Sometimes these options have a higher initial cost, but will save you money in the long run. Go with a contractor who will discuss all options and is not focused solely on price. Check with your local electric utility for possible rebates to help you move to a higher efficiency system.

## Is there any regular maintenance I should be doing?

Before the technician leaves, make sure they show you any regular maintenance required, such as changing filters or operating the thermostat. Replace or clean your filters once a month depending on the type. Have your system checked and serviced twice a year to ensure maximum efficiency and get ahead of any potential malfunctions, especially prior to major temperature changes in summer or winter.





# Frequently asked questions about off-peak electric heat



## 1. Are incentives offered to convert to off-peak electric heating?

Many cooperatives and municipals have programs that help customers install a quality off-peak heating system. Contact your power supplier for specific details.

## 2. What will it cost to install off-peak electric heating?

Installation costs will vary depending on the type of heating system and electrical service capacity you currently have. Your local electric cooperative or municipal can assist you in providing names of contractors who can install a quality off-peak heating system. Call your member services representative today.

## 3. What steps are involved in adding off-peak electric heating?

This depends on the age, type and configuration of your current heating system. There is an off-peak heating option that will fit your situation. Contact your electric cooperative

or municipal for more information about off-peak heating solutions.

## 4. Can off-peak electric heating reduce my heating costs?

Depending on the type of energy you are currently using to heat your home, off-peak heating can reduce your heating costs. Check with your local cooperative or municipal for cost comparisons. Ask how you can save on your heating costs with a quality off-peak electric heating system.

## 5. When does control occur, and how long does it last?

Control of your off-peak electric heating system can occur several times during a heating season, usually on the coldest days of the year. Load control depends on several factors, including temperature and wind conditions. It may be cold in one part of the region and significantly warmer in another, in which case control may not be necessary.

Control can be spread over several hours or several days, depending on the severity of the weather and availability of electric energy. A reliable backup heating system is essential, as control times of 200-400 hours for the winter heating season can be expected.

## 6. Can you recommend someone to install the system?

Your local cooperative or municipal has a list of contractors who install quality off-peak heating systems. Contact your member services representative for a list of contractors in your area.

## 7. Are financing programs available?

Special financing programs are available from some cooperatives and municipals to help consumers install a quality off-peak electric heating system. Check with your member services representative on how you can finance your off-peak heating installation.

For more information, contact your electric cooperative or municipal system.

### COOPERATIVES

**Beltrami Electric Cooperative**  
Bemidji, MN · (218) 444-2540

**Cass County Electric Cooperative**  
Fargo, ND · (701) 356-4400

**Cavalier Rural Electric Cooperative**  
Langdon, ND · (701) 256-5511

**Clearwater-Polk Electric Cooperative**  
Bagley, MN · (218) 694-6241

**Nodak Electric Cooperative**  
Grand Forks, ND · (701) 746-4461

**North Star Electric Cooperative**  
Baudette, MN · (218) 634-2202

**PKM Electric Cooperative**  
Warren, MN · (218) 745-4711

**Red Lake Electric Cooperative**  
Red Lake Falls, MN · (218) 253-2168

**Red River Valley Cooperative Power Association**  
Halstad, MN · (218) 456-2139

**Roseau Electric Cooperative**  
Roseau, MN · (218) 463-1543

**Wild Rice Electric Cooperative**  
Mahnomen, MN · (218) 935-2517

### MUNICIPALS

**Bagley Public Utilities**  
(218) 694-2300

**Baudette Municipal Utilities**  
(218) 634-2432

**Fosston Municipal Utilities**  
(218) 435-1737

**Grafton Municipal Utilities**  
(701) 352-2180

**Halstad Municipal Utilities**  
(218) 456-2128

**Hawley Public Utilities**  
(218) 483-3331

**Park River Municipal Utilities**  
(701) 284-6150

**Roseau Municipal Utilities**  
(218) 463-1542

**City of Stephen Utilities**  
(218) 478-3614

**Thief River Falls Municipal Utilities**  
(218) 681-4145

**City of Warren Water and Light**  
(218) 745-5343

**Warroad Municipal Utilities**  
(218) 386-1873