



**Claverack Rural
Electric Cooperative, Inc.**
"Powered by Excellence"

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Heat Pumps

Many members have contacted the Claverack offices requesting information about heat pumps. Heat pumps are an excellent option for heating and cooling your home. There are many advantages to installing a heat pump.

There are basically two types of electric-heating options. The first is electric radiant heat. Most people know this as electric baseboard heat, but it can also refer to portable plug-in heaters of various types. Some members even have electric radiant heating components in a furnace. This type of heat is 100 percent efficient because all of the heat is applied directly to the living area. There is no loss of heat or fuel in a combustion process, as there is in an oil, gas or propane burner. You get 3,413 British Thermal Units (BTUs) of heat for 1 kilowatt hour (kWh) of electricity. Unfortunately, it takes a lot of BTUs to heat a typical home, and that can get expensive at 3,413 BTUs per kWh. There must be a better way!

The second electric heating option is the heat pump. After the development of modern refrigeration, someone realized that the refrigeration process took heat out of the ice box to make it cold. That heat got removed from the ice box, but got put into the kitchen. Anyone who has stood barefoot in front of the refrigerator can attest to this! This concept launched the first heat pump.

A heat pump does not really make heat, it simply moves heat through the refrigeration process. You may ask how it can move heat on a cold day. There is always some heat in ambient air (the normal outside air around us). Let's consider a freezer that is 20 degrees. If we continue to run the refrigeration equipment, we can remove more heat from the freezer until the temperature is reduced to any temperature we desire, even down to well below zero. A central air-to-air heat pump outside your home can remove heat from the ambient air and apply that heat to your home. An advantage of this process is more efficient heating. A 300 percent efficient heat pump produces 10,239 BTUs for 1 kWh of electricity (three times the amount of heat compared to electric radiant heat). Another advantage is that by reversing the refrigerant cycle, the same unit can remove heat from your home and move it to the ambient air (air conditioning).

There is, however, a down side. As the ambient air temperature goes down, it is more difficult to extract heat, and the unit must work harder. Efficiencies decline as ambient air temperatures go down. At about 17 degrees, air-source heat pumps drop in efficiency to 100 percent (no better than electric radiant heat). They do not drop below 100 percent efficiency. Because of this reduced efficiency, the cost of producing the same amount of heat is a lot more than the cost of producing it with an ambient air temperature of 50 degrees. Some people even experience cold homes when low temperatures are extreme because the heat pump simply can't produce the needed heat fast enough. This is why air-to-air heat pumps are popular in the South, but see limited use in harsh Northern climates.

Many years ago someone realized that the heat pump worked great when the ambient air temperature was 50 degrees or more. It was very efficient. Was there a way to have 50-degree temperatures all the time, in any climate? As a matter of fact, the temperature of the earth is about 50-degrees all the time, even in cold climates, once you get about 5 feet into the ground. What if we could use that temperature to run our heat pump? How would we harness the heat in that 50-degree soil? We could drill a hole or dig a trench or get to the bottom of a pond and install some piping. Properly constructed, we could circulate water through a maze of pipes and regardless of the water temperature going in, the return flow would be 50-degrees because of the ground temperature. We could then use that 50-degree water to extract heat using our heat pump. We could even extract heat from our home and transfer it to the water. This is how the ground source heat pump was born!

The ground source heat pump never loses its full efficiency because the ground water loop temperature always stays the same. Some newer models are achieving efficiencies of up to 500 percent! That equates to 17,065 BTUs for just one kWh of electricity. This heating option, when compared to others, offers a tremendous savings.

The ground-source heat pump is not for everyone. Your home must be properly constructed and insulated to ensure that this option will work for you. Ground-source heat pumps are also very expensive to install, often costing \$20,000 or more. Any serious consideration of a ground-source heat pump should weigh your investment against your expected payback in operational savings. When looking for heating alternatives, comparing electric heating options to traditional fossil fuel systems is a good idea. Please see the article HEATING COMPARISONS in the member information section of this Website for information on accurate ways to compare costs.

Listed below are some local heat pump suppliers and installers in our area. There are also some specific links that you may find helpful. We hope that this information is helpful in your search for the heating system that is right for you. If you would like additional information about heat pumps please call your Member Services department at the 1-800-326-9799. Claverack Rural Electric Cooperative, giving our members straight talk about costs.

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DeCristo Plumbing & Heating, Canton, PA (570) 364-5251

Leo Edsel Contracting, Stevensville PA (570) 744-2853

Monk Heating & Air Conditioning, Dallas, PA (570) 333-COOL

Schoonover Heating & Plumbing, Canton, PA (570) 673-5123 or 1- 800-634-1038