

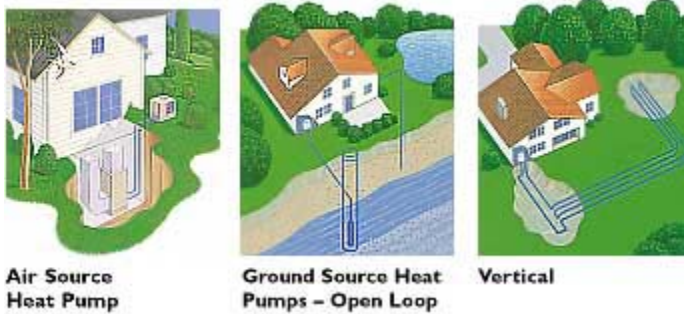
Energy Efficiency Tips & Tools

Heating and Cooling

Heat Pumps

Consider a heat pump for efficient heating and cooling

Electric heat pumps are year-round heating and cooling systems. They are called heat pumps because they "pump" or move heat from one place to another. If your seasonal home requires year-round heating and cooling, heat pumps may be a valid option.



There are three basic types of heat pumps:

- Air-to-air heat pumps get their energy from the outside air
- Water-loop heat pumps require access to a nearby well, pond, stream, or lake
- Ground source heat pumps take their heat from a circuit of pipes buried in the ground

How heat pumps work

People who are not familiar with heat pumps may wonder how they work. A good analogy to a heat pump is a refrigerator. They both work the same way and utilize many similar components.

Using a compressor and a refrigerant in coils of tubes, a refrigerator extracts the heat from the inside of the unit and releases it to the outside through the coils at the back. (Contrary to what some people believe, refrigerators do not actually make cool air.)

When a heat pump is set in cooling mode, it works exactly like a refrigerator, taking the heat from the inside of the home and releasing it outside.

During the heating season, it works like a refrigerator in reverse, extracting the heat from the outside air and bringing it into the home. Even on cold days, there is still heat to be extracted from the outside air, water, or ground. During extremely cold weather, back-up heating incorporated into the heat pump system, can be used to supplement the heating needs.

Since a heat pump transfers heat instead of producing heat, it is two to three times more efficient than traditional heating systems.

Benefits - Lower energy costs and maintenance

- Compared to a conventional electric heating and cooling system, a heat pump can cut energy costs by 40% to 70%.
- Maintenance costs are reduced since most of the heat pump unit is located inside the building and is not subjected to the outdoor weather conditions.
- Heating and air conditioning is provided by a single unit. Some heat pumps can provide heating and cooling simultaneously.
- Heat pumps use a renewable energy source. Stacks and fuel storage are not required. Mechanical rooms, when needed, can be greatly reduced in size.
- Heat pumps are reliable performers. Independent studies show that over 85% of current heat pump owners would install one in their next home.

Air source heat pumps

The most common heat pumps are air source. An air source heat pump is used in conjunction with a back-up heating system. During the coldest periods it is more efficient for the back-up furnace to provide the heating. On average, air source heat pumps operate up to 70% of the heating season, with the auxiliary heating system carrying the balance. The automatic switch-over temperature varies, depending on the back-up energy source, but is usually between -2°C and -10°C. This way, each heating system works in the temperature range where it is most energy efficient.



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Benefits

- Compared to electric resistance heating, an air source heat pump may save you up to 30% on your annual heating bill
- Operating cost for summer cooling is similar to central air conditioning

Maintenance

- Check air filters monthly and clean or replace if necessary
- Have a professional heat pump contractor inspect your unit annually
- Keep the outdoor unit clear of leaves, grass, ice and snow

Ground/water source heat pumps

Ground/water source heat pumps are the most efficient heating and cooling technology available today.

A ground source heat pump gets its heat from a circuit of pipes buried in the ground. A refrigerant solution circulates through the pipes picking up the natural heat of the earth which is extracted by the heat pump.



A water source heat pump can be used if you have a well, pond, stream or lake. In this case the water is drawn up directly to the pump's heat exchanger where its heat is extracted and the water is returned to the source.

In both cases, the process is reversed in summer when heat and humidity are drawn from the house to provide central air conditioning.

Aside from cutting your heating bills by up to 65% and giving you efficient air conditioning, ground/water source heat pumps can lower your water heating costs on average by 50%, and provide you with free heat for the hot water tank when you're air conditioning.

Ground/water source heat pumps can meet almost all home heating requirements. That's because earth and groundwater temperatures are higher than air temperatures in winter. About 50 - 75% of the energy used to heat the home is extracted from the ground or water. Efficient electric resistance heaters are installed to provide the supplementary heating needed for only the very coldest days. Some systems are designed to provide adequate heating capacity without the need for back-up heating.

Benefits

- Compared to electric resistance heating, a ground source heat pump may save you up to 65% on your electrical heating bill, and up to 25% on air conditioning
- Some models also provide water heating

Maintenance

- Check air filters monthly and clean or replace if necessary
- Have a professional heat pump contractor inspect your unit annually

Reference:

http://www.hydroonenetworks.com/en/efficiency/heating_cooling/heat_pumps/