

Clean Heat Rhode Island

RESIDENTIAL GUIDE TO Heat Pumps



Air Source Heat Pumps

Air Source Heat Pumps (ASHPs) provide home heating and cooling in a single system. They are two to three times more efficient than fossil fuel heating systems and one of the most cost-effective heating and cooling methods on the market. This is because they move heat rather than burn fossil fuels to create it. ASHPs also have the potential to be entirely fossil fuel free when the electricity is generated by renewables.

One outdoor unit can be connected to multiple indoor units. There are many configurations of indoor units available, including ductless and ducted equipment that distribute heating and cooling throughout a building.



ASHPs have an outdoor compressor that should always be raised above the ground to keep the internal fan above snow.



Ducted heating and cooling vent



Ductless indoor wall unit

A combination of ducted and ductless systems may be suitable for some homes. Heat pump technology provides lots of flexibility to mix and match indoor unit types to meet your needs. Using the right kind of indoor equipment can optimize comfort, control, and energy efficiency. Ask your contractor what they recommend based on the layout and heating/cooling needs of your home or business.

CONSIDERATIONS

EFFICIENCY FIRST:

Before upgrading your heating system, consider preliminary measures, such as sealing and insulating your ductwork or completing weatherization work.

ELECTRICAL USAGE:

A heat pump is an electrical system, so running one will add to your electrical use. In many cases, that additional electrical use is offset by savings elsewhere, such as a propane or oil heating fuel bill.

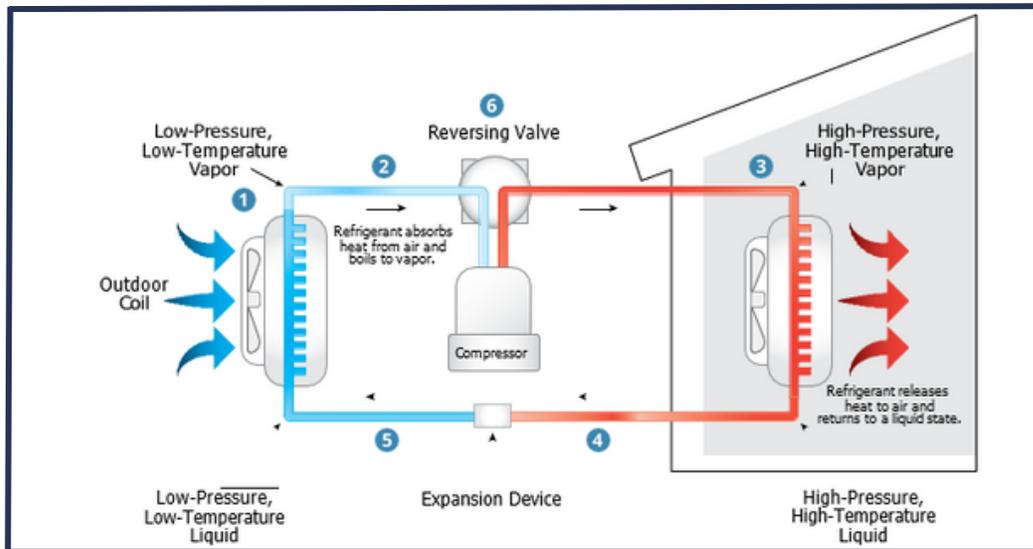
QUALITY INSTALLATION:

Heat pumps work best when correctly sized and designed for your home or business. Schedule a heat pump consultation and work closely with a qualified contractor to help ensure your system is designed to meet your heating and cooling needs.

Air Source Heat Pumps

How They Work

The graphic below represents an ASHP process in heating mode. The process is simply reversed when in cooling mode. This process uses a refrigerant, which is a type of liquid that absorbs and releases heat quickly, similar to refrigerants that you add to your car's AC system or the coil behind your refrigerator.



1

A fan blows air over a system of coils with very cold, low pressure refrigerant which absorbs heat from the outside air. Heat can be drawn from the air even when it's very cold out.

2

The refrigerant flows to the compressor which mechanically increases the pressure of the refrigerant, causing the captured heat to warm up even more.

3

The refrigerant moves to the indoor unit and releases heat.

4

The refrigerant then moves to the expansion device, lowering the pressure of the refrigerant, which makes it very cold again.

5

The refrigerant returns to the outdoor unit to begin the cycle again.

6

The reversing valve is responsible for directing the flow of the refrigerant when switching between heating and cooling mode.

When shopping around for a heat pump, look for a system with a high heating seasonal performance factor (HSPF2) greater than 7.7 and a Seasonal Energy Efficiency Rating (SEER2) greater than 14.3. These indicate that the system works efficiently in our climate.

Ground Source Heat Pumps

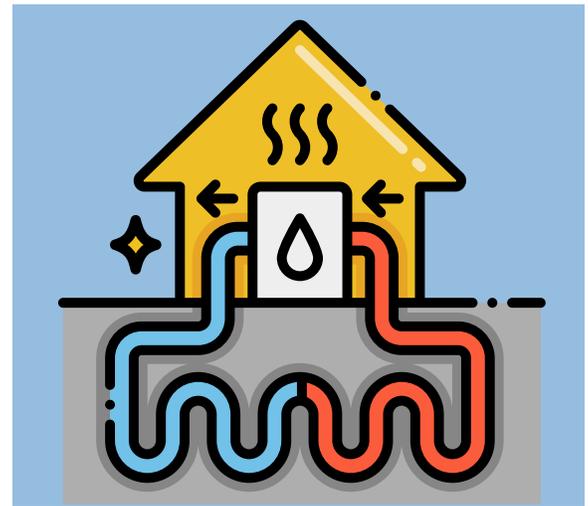
Ground source heat pumps, also known as geothermal heat pumps, are the most efficient type of heat pump. These systems rely on the stable temperatures underground to heat and cool your home throughout the year. To do this, they use an underground pipe system to distribute heat to and from the space they condition. In the winter months, heat is extracted from the ground and used to warm your home. In warmer months, the process can be reversed to effectively cool your home.

SYSTEM TYPES

CLOSED LOOP:

These systems continuously circulate a mixture of water and glycol fluid through submerged or buried pipes.

- Horizontal - Piping is buried at shallow depths over a wide area
- Vertical - Piping is installed vertically, often drilled down into 150 -400 ft
- Pond/Lake - Piping is placed into the water, coiled into circles at least 8 ft deep



OPEN LOOP:

These systems use wells or bodies of water as the heat exchange fluid. After the water circulates through the system it returns to the well or surface discharge.

CONSIDERATIONS

EFFICIENCY:

By taking advantage of stable underground temperatures, ground source heat pumps extract more energy from the ground than they use to operate. This makes them 25-50% more efficient than air source heat pumps.

LOW MAINTENANCE:

Once installed, ground source heat pumps require minimal maintenance as the bulk of the system is underground.

LONG-LASTING:

Ground source heat pumps are a good long-term solution as they last longer than other heating and cooling systems. In fact, the underground infrastructure of a ground source heat pump can last 25-50 years.

Heat Pump Water Heaters

Heat Pump Water Heaters provide efficient water heating. They are two to three times more efficient than most fossil fuel heating systems and one of the most cost-effective water heating methods on the market. This is because they move heat, rather than burn fossil fuels to create it. Heat pump water heaters have a small heat pump on top of the storage tank that uses heat in the ambient air to warm up the water.



EQUIPMENT TYPES:

There are a few different types of heat pump water heaters. The most commonly available is a 240-volt hybrid heat pump water heater that features an electric resistance backup. Less common are 120-volt heat pump water heaters and split-system heat pump water heaters. 120-volt systems do not include electric resistance backup and a split-system's heat pumps are outside.

TANK SIZES:

There are multiple sizes of heat pump water heaters available. Based on your home size, speak with your contractor about the right size for you. Sometimes when installing a 240-volt hybrid system, going one size up can actually increase efficiency and reduce operating cost since the electric resistance backup is less likely to be used. You can also set the water heater to heat pump only mode.

CONSIDERATIONS

DEHUMIDIFICATION & COOLING:

Heat pump water heaters will cool and dehumidify the space they are in. It usually isn't enough to replace a dehumidifier in your basement, and the space won't get much cooler than a few degrees during high usage.

ELECTRICAL USAGE:

A heat pump water heater is an electrical system, so running one will add to your electrical use. In many cases, that additional electrical use is offset by savings elsewhere, such as a propane or oil heating fuel bill.

QUALITY INSTALLATION:

Heat pump water heaters need air space around them to operate efficiently and shouldn't be confined. Usually 700 cubic feet or more provides plenty of air space, or, one can add louvers to closet doors or ductwork to the air intake.

Working With Your Installer

To maximize comfort and efficiency, your heat pump needs to be sized correctly.

Many contractors use general rules of thumb or swap out systems like for like. These habits should be avoided when you install a new heat pump because they can lead to poor performance and higher operating costs.

THINGS TO DO BEFORE INSTALLING A HEAT PUMP

- Contact your local utility for a home energy assessment (often provided free of charge!)
- Weatherize your home
- Find out if you need to upgrade your electrical panel to 200 amp (common in older houses)
- Get quotes from at least three installers (see below)
- Get a quote comparison report to inform your decision (visit CleanHeatRI.com to learn more)

ENSURE YOUR HEAT PUMP IS SIZED CORRECTLY

- Request a blower door test to determine where and how much air leakage is in your home
- Insist the installer perform a load calculation (sometimes referred to as a “Manual J”), which determines how much heating and cooling your home needs, based on the space
- Track how much fuel you typically use for heating and provide the installer with this information
- Consider both ducted and ductless indoor equipment. Ducted equipment can be helpful to heat and cool small rooms evenly
- Tell your installer about the areas of your home that are too hot or too cold for your comfort level

TREAT YOUR INSTALLER RIGHT

- On the day of the installation, let the person(s) know which bathroom they can use, and offer them something to drink
- Try to understand their work areas and clear a wide path if possible
- If you have pets, make sure you secure them away to avoid any unintentional escapes
- Having a good relationship with your contractor pays off for both parties

Questions To Ask Your Installer



CONFIGURATION

- Where and how will the outdoor unit(s) be mounted?
- Will exterior piping be visible? If so, what type of covering will be used?
- What type of indoor units do you recommend, where will they be located, and why?
- Can a heat pump work effectively with my existing ductwork?
- How will the controls and thermostat be set up?



COST

- What is the installation price and what incentives may be available?
- How will I receive these incentives?
- What should I expect to pay for regular maintenance?
- Will I need to upgrade my electrical panel, and if so, how much will that cost?



QUALITY ASSURANCE

- Are you participating in the Clean Heat Rhode Island Heat Pump Installer Network?
- Will you install in accordance with the Clean Heat Rhode Island Air Source Heat Pump Quality Installation Check-list?
- Do you provide a warranty for the systems you install?
- Have you participated in manufacturer training for the systems you would install?
- Can you provide references from previous customers with similar systems?
- Will you use subcontractors in the process? If so, who are they and what work will they perform?
- Will you show me how to properly operate and maintain the system (e.g., thermostat settings, cleaning air filters)?



TIMING

- How long will it take for the system to be installed?
- What should I do to prepare for the installation?
- When is the best time to install if I'm replacing or supplementing my existing system with a heat pump?

CleanHeatRI@AbodeEM.com

www.CleanHeatRI.com

(401) 341-6183

