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Heat Pumps

Heat Pump Buying Guide

By Consumer Reports
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A heat pump heats and cools your home, functioning like a combined furnace and central air conditioner. Because they absorb and move ambient heat rather than burning fuel to create energy, heat pumps electric enough to generate it, heat pumps are exceptionally energy-efficient and environmentally friendly compared with other heating and cooling systems. Most heat pumps are installed in moderate climates and installed in more homes than ever. They now come in many configurations for heating, ventilating, and air-conditioning systems depending on where you live and other factors, such as the cost of electricity.

A heat pump aren't the perfect system for every home, but the technology is worth considering whether you need to replace an upgrade part of your HVAC system.

Federal tax subsidies also make this form of heating and cooling more affordable. Some homeowners can now get a tax credit worth 30 percent of the cost to buy and install qualifying heat pumps, up to $2,000 a year. That tax credit also applies to installation of qualifying heat pump water heaters, heat pump clothes dryers, systems. Other tax deductions, tax credits may be used by people who don't itemize.

This guide will help you find the right heat pump for your home, whether it's a ducted system or a mini-split, and whether you're looking to replace or supplement a traditional heating and cooling system or simply want to upgrade to a more efficient heat pump. We'll describe the features to look for and state tips on how to find a contractor to install it. We'll also explain how much it costs to run a heat pump since it's installed.

Consumer Reports members can also use our heat pump ratings for the most reliable brands of ducted heat pumps and the brands with the highest owner satisfaction. Our ratings are based on data from our annual survey of member surveys covering more than 10,000 heat pumps in use around the world, installed between 2005 and 2021. We don't test or recommend specific heat pump models because the systems are highly customized to individual houses and climates.

How Does a Heat Pump Work?

The most common type of heat pump, called an air-source heat pump, works by absorbing heat from the air and moving it either from outdoors to indoors for heating model or vice versa for cooling model. It's the same way an air conditioner works, and many homes with central air conditioning have a heat pump. The two types of appliances look similar, are generally manufactured by the same companies, and use almost of the same parts. Heat pumps just have a few small differences that allow them to move heat in two directions, in and out.

Until relatively recently, air-source heat pumps were predominantly used only in the southern U.S., where there is enough heat for for summers and mild winters, and the technology has improved, making on-source heat pumps a practical choice elsewhere around the country, even places with cold winters. As counterintuitive as it seems, there's always some free heat energy in the air, even when it's cold out. The latest models can extract enough heat from cold air to deliver heat and move it into your house.

Heat pumps offer a lower carbon way to heat your home than other options, even if they run on electricity that's made by generating fossil fuels. When they're powered by renewable energy, whether that's rooftop or community solar or a cleaner grid, they become even more sustainable. Regardless of how you heat your home, but they're even more beneficial with heat pumps.

Types of Heat Pumps

In the U.S., we typically use air-source heat pumps and most often a ducted system as an in-to-net pump. That means they absorb and release heat from the air outdoors to heat and cool the air inside your home by sending it through a forced air system (rather than radiators). Among air-to-net heat pumps, two types are most common in residential homes:

Ducted Air-Source Heat Pumps

The most common type of heat pump operates a lot like a central AC. There's an outdoor unit and an indoor unit, both of which have aluminum fins and a coil, a refrigerant and a compressor. The refrigerant flow filled with fluid that circulates between the two units. The outdoor unit is a heat exchanger, which uses fan and a blower to circulate air through the coil. The indoor unit is also a heat exchanger, which uses fan and a blower to circulate air through the coil and of air vents placed around your home. According to CR's member survey, the overall median price paid for the purchase and installation of a ducted heat pump was $8,000 in 2021, the most recent year for which we have data. For homeowners choose a 5-ton heating pump, which is good for about 2,500 square feet, according to Homebreakers a home-improvement services marketplace.

Ductless Mini-Split Air-Source Heat Pump:

This kind of system heats and cools air just like a ducted model, but it doesn't rely on ductwork to move warm or cool air through a house. Instead, the outdoor unit sends refrigerant through a pipe to one or more indoor units, which are installed throughout the home. It's a common choice if ductwork is not in place, if it's pointy to a house or section of a house that doesn't have ducts. On the number heads you usually plenty of high-wall units, which are mounted on the wall, but a bed or dorm the space, there are heads that can be placed inside the ceiling or floor, or even hidden in a piece of furniture. Ductless mini-splits are more quiet than the energy-loses compared with ductwork. CR doesn't have enough tested specific data yet to report on the prices members paid to purchase and install ductless mini-splits. According to Homebreakers, the average cost to install one unit is $3,000, but the price could range from $2,000 to $6,000 depending on the number of indoor units and the complexity of the job. It costs upward to about $14,000, depending on home size, heat pump capacity, type of heat pump, and how many units you choose.

Other "Types of Heat Pump"

There are a few other types of heat pumps that have proved to work well in some situations but are less common than air-source heat pumps.

Ground-source or geothermal heat pumps absorb and release heat underground, where the temperature is a constant 55° F to 60° F all year. They are highly efficient because they don't have to compensate for big temperature swings the way air-source heat pumps do. But because of the heat exchanging pipes are buried underground (either horizontally or vertically), ground-source systems can be prohibitively expensive to install, costing upward of $25,000 for a typical system. Ground-source systems can cost from $6,000 to $50,000 or more. Federal and state incentives can reduce the cost significantly, and the systems are so energy-efficient that they can pay for themselves over time. Because the cost of installation is so high, they are more for conservative solutions.

Water-source heat pumps work like ground-source systems, except they're laid on the bottom of a pond rather than underground. If you have an appropriate body of water nearby, this option can be easier and less expensive to install than ground-source systems.

Air to water heat pumps use outdoor units similar to air-to-air models, but they distribute heat through a hot water system. They're common in much of Europe and Asia, where they are used to heat radiant heat systems in the Northeast and Midwest rely on hydronic radiators for heat.

Why Buy a Heat Pump?

You already have one and need to replace it. If you live somewhere with cold winters, you might have heard about heat pumps since recently. The U.S. Energy Information Administration reported that 33 percent of U.S. households in 2020 used a heat pump as their primary heating system. Many homeowners who have a heat pump and you're happy with it, the entrenched thing to do when it comes time to replace it (generally after 10 to 15 years) and decide to replace it with a similar model, which will probably be more efficient. CR members can enter which brands of heat pump systems make their owners the happiest, based on data we've collected from our member survey.

You want to replace your central AC (or add one) but with in air conditioning. In warmer climates, a heat pump can be a good choice if you're looking for a system that's practical for both systems is essentially the same thing. The cost of installing a heat pump tends to be higher than it is installing a central AC with a similar efficiency rating and capacity, though the exact amount can vary. Local and various models allowed installation cost differences ranging from 3 percent to more than 50 percent, according to Consumer Reports' analysis of data from Homebreakers and related if you install it during a mini-split, mitigating some of the cost.

So if you're replacing or adding an AC anyway, whether it's a central system or a mini unit, it may make sense to pick a little extra for a heat pump and keep your home comfortable year round. Heat pumps can be a good choice if you're looking for high-efficiency heating on the milder days of the year. (More on this later in system listed.)

You want to add heat to a chilly room. A ductless mini-split heat pump is an affordable and effective way to add climate control to parts of your house where the main system doesn't quite work—such as in finished attic, garage workshop, or home addition.

You have with Multihead? Suits like propane or heating oil, with an electric-resistance furnace or electric baseboard heaters. These are all expensive ways to heat a home and depending on such factors as where you live and the cost of electricity, you're likely to save money over time if you switch to a heat pump, even when you include the cost of installing it.

You want to significantly reduce your carbon footprint. Almost half of a typical household's energy consumption goes to heating and cooling. Heat pumps efficiently, and with cleaner sources of power, will go a long way toward making your home more sustainable. Switching from a gas furnace to a heat pump will reduce your household's carbon footprint by an amount equivalent to not driving a car for nearly a year in the Northeast, according to a 2016 study from the University of California. Davis. It's one of the most effective ways to reduce your carbon footprint, and it doesn't require a lifestyle change.

Your home has ductwork. More than half of all homes in the U.S. already use ducts to distribute heating and cooling. A ducted heat pump can be installed in place of a furnace or utility-based solution, such as for incentives or cost-related, a heat pump can be a good choice. Ductless mini-splits are a good choice if you don't have ductwork. Contractors of America (ACCA) Manual J. Ductless installations should be sized for any air-sealing or insulation upgrades we make to your home and should be done whether you're replacing a unit or installing a new system.

One nuance to consider: If you're planning to keep a backup heating system alongside your heat pump, consider getting a right-sized heat pump. A contractor can help you figure out whether this makes sense in your home.

Note that hybrid systems need far less capacity to heat a space than those that are better suited because they're much more energy efficient. For example, if your home needed a 100,000-Btu/hr furnace, it may need only a 36,000-Btu/hr heat pump.

Comparison Tape

The compressor is the heart of a heat pump—it's the part that actually pumps the heat. Basic heat pumps have a single-speed compressor. It's either on or off. The system works well enough, but the temperature and relative humidity in your home can vary. Two-stage and variable-speed compressors are more expensive but more adaptable the savings, but they're still pretty good.

The gold standard is a variable-speed compressor. It's designed to run almost constantly, adjusting itself over time to match up to much heating or cooling. It takes to keep your home comfortable. It's also much better at keeping relative humidity under control than single-speed models.

Variable-speed compressors not only keep your home more comfortable but also are more energy efficient. It may seem counterintuitive, but it takes much less energy to move a tiny bit of heat all the time than to move a lot of heat quickly.

Efficiency

Some heat pumps use less energy than others to deliver the same level of comfort. In cooling mode, efficiency is commonly expressed as the seasonal energy efficiency rating, or SEER. The higher the SEER, the greater the efficiency. In heating mode, efficiency is commonly expressed as the heating seasonal performance, or HSPF. Again, the higher the number, the more energy-efficient the system.

As of January 2023, the Department of Energy adopted new testing methods for energy efficiency, replacing the SEER and HSPF values with SEER2 and HSPF2, while also increasing efficiency standards.

Heat pumps with higher SEER/SEER2 and HSPF/HSPF2 ratings tend to cost more, but they can save you money over time. Because they use less electricity, they may be eligible for better tax incentives. Consumer Reports likes efficient models. Heat pumps with higher SEER ratings also tend to have higher HSPF ratings, though there's no direct relationship between the two. If you live in a cold climate, you pay closer attention to the SEER in cold climates, look for a higher HSPF.

Climate Performance

If you live in a region with cold winters, you'll need to either pick a heat pump that's rated to work well in the lowest temperatures that your region regularly experiences or have a secondary heating system to back up your heat pump.

All air-source heat pumps struggle to perform in temperatures drop. We space they can effectively heat shrinks and they don't work as efficiently. The threshold for the compressor to switch from model to model. Some heat pumps can't work 35° F, others at 10° F or lower.

Models marketed as cold-climate heat pumps can work to their full potential all the way down to 5° F and may deliver some heat even down to -20° F or lower. The Northeast Energy Efficiency Partnership maintains a list of models that meet its criteria. Ductless models are a good option for cold climates.

If you live in an area where the temperature rarely or never drops below freezing 32° F, a basic heat pump can handle the bulk of your heating and cooling needs. Even if you live in a moderate climate, a variable-speed system (sometimes built into the heat pump itself) for unusual cold snaps.

Noise

Manufacturers publish the noise levels of their products in the user manual and often on their websites. They tend to include noise estimates across a variety of outdoor temperatures and fan speeds, measured in decibels. A lower rating is better, especially if the heat pump will be installed near a bedroom window.

Reliability

In our member survey, best pumps from eight brands were judged highly reliable, but only two of them also got top marks for owner satisfaction. Consumer Reports members can see the predicted reliability and owner satisfaction ratings for 29 brands of ducted heat pumps. Homebreakers, a home improvement site, ranked 2019 heat pumps they bought and installed in their own homes between 2011 and 2021. Those findings are summarized in our guide to the Most and Least Reliable Heat Pumps.

Find the Right Contractor

As with most heating and cooling systems, it's wise to hire a professional to handle the installation and maintenance of a heat pump. Contractors who install and repair heat pumps is smaller than with traditional heating systems, making proper vying essential. Here are some tips for hiring a good contractor.

Ask around. Seek referrals from neighbors, family members, business associates, or friends who have installed a heat pump and ask how it's been working. Ask about parts of the country (though that's changing quickly), or green energy resource groups might be able to help you find a contractor who is familiar with the technology and knows how to install it properly. It's wise to get price quotes from at least three contractors.

Check their background. Contractors who bid on your installation should show you certification of bonding and insurance, plus any required contractor's licenses. Check with your state, county, and city to find out what licenses are required, completed recently. It's also if technicians are certified by a trade organization, such as North American Technician Excellence or HVAC Excellence to service residential heating and cooling equipment. These and similar programs test the technician's knowledge of specific types of equipment and their proper service methods.

Get specifics. Be wary of a contractor who bases estimates merely on house size or square footage. Instead, the contractor should perform a load calculation, a detailed and costly-to-perform using a recognized method, such as one located in the HVAC Residential Load Calculation Manual, also called Manual J. An additional reference for processing ductwork needs is Manual D. The calculations produce a detailed room-by-room analysis of heating and cooling needs. Ask for a printout of all calculations and assumptions, including ductwork design.

Your contractor should also scope out a proper location for the outdoor unit. It compressor needs adequate airflow to operate efficiently. Make sure to keep at least 2 to 3 feet of space between the unit and any plants or structures. There should be at least 5 feet of clearance above the unit. Trees and shrubs should be kept at least 10 feet away from the unit. Trees and shrubs could grow into the unit and cause access and service the unit. And local building codes might have regulations about how close the outdoor compressor is allowed to be from a neighbor's window or door or property line.

If you're very handy and have experience with electrical, plumbing, and carpentry work, you could save money by installing a mini-split system yourself. Do-it-yourself systems are on the market, and numerous online videos explain what to do.

But even with a DIY kit, you'll need to drill a hole several inches through your exterior wall for the refrigerant, drain tubing, and electrical wiring. Do you have the advanced DIYer? says Daniel Tessier, a Consumer Reports project leader who has installed few heat pumps himself.

Keep in mind, too, that your manufacturer may technically require several permits, including a licensed electrician to do the electrical work.

Do You Need a Backup Heating System?

With the right heat pump and system design for your home and regional climate, a backup heating system shouldn't be necessary.

But in cold climates, bearing in backup system can be the most cost-effective way to keep you more comfortable. You can even think of it as a backup heat pump rather than a system with a backup. You'll use the heat pump most of the time (including when it's cold out) and switch to the backup system when it's too cold for the heat pump to work efficiently. The cost of installing a second heat pump or a gas furnace as a backup system is certain automatically at a specific outdoor temperature.

Hybrid systems will save a lot of energy and carbon emissions compared with most other setups and can offer some peace of mind in colder climates.

Here are a few common types of hybrid setups:

Electric strip Common in mild climates, a simple electric heating element can be built into the heat pump itself or the indoor air handler. These strips are a lot of energy, but they're very inexpensive to install and operate, and it can be effective way to get through short cold snaps.

Mini-split plus baseboard. Ductless systems that run on oil or propane, or "regular" electric resistance heat, tend to be expensive to run, but mini-split systems that are installed in the same room as the baseboard heaters can be a good choice. Some contemporary installs of mini-split units can provide heat (and sometimes heat and cooling) needs and keep the old outdoor system for the coldest days.

Ducted heat pump plus furnace It's the same concept as the mini-split and baseboard combo above. You'll install the heat pump just like you'd install a central AC.

Heat Pump Maintenance

The conventional wisdom is that heat pumps should receive regular maintenance for optimal performance, although our member survey showed no correlation between the frequency of maintenance and how likely a heat pump was to need maintenance or repairs. But a well-maintained system should run more efficiently.

If you hire a service technician, you'll want them to start annually to clean and flush the coils, drain the pan and drainage system, and vacuum the blower compartments. The contractor should also check to make sure that the system is operating properly, that the refrigerant levels are in the ranges, and that all mechanical components are working properly.

You can also handle some maintenance on your own. Clean grilles and filters monthly. Clean debris and dirt from condenser coils. Check the filter in the indoor unit. Perhaps follow the manufacturer's directions. Most filters need to be changed when the thicker is disposable filter, the less often it needs to be changed. (The HVAC filters are big but between three and 12 months.)

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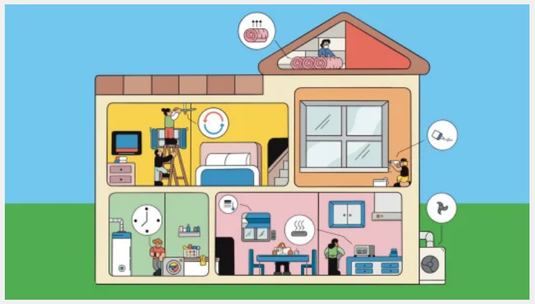

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