#### What is a Heat Pump?

According to the Department of Energy (DOE), air source heat pumps (ASHPs) are the most common type of heat pump. In ASHPs, heat is transferred between your home and the outdoor air, which is more efficient than a gas furnace or wood burning stove which creates the heat. Heat Pumps work in cold climates because heat energy is still naturally present in the earth and air even in low temperatures. Cold climate heat pumps (CCHP) are designed specifically to work in lower temperatures. Heat Pumps provide cooling and dehumidifying through running the process in reverse, while being virtually silent. Air source heat pumps can take the place of your furnace, air conditioning or both. They use up to 66% less energy than a traditional heating and cooling system and are the most energy efficient option on the market.



### How Do I Decide Which Heat Pump Is Best For Me in my Existing Home?

There are many configurations to consider, and it is important to do research to determine what is best for your home. If your home already has a furnace and ductwork, it is most likely financially smartest to install a centrally-ducted heat pump to replace the furnace. In some cases, a supplemental heating system may be necessary, and advanced guides are available to determine when your heat pump should operate versus the backup.

Cold-climate heat pumps are an option with more versatility to heat your home in regions with lower outdoor temperatures. If you already have electric heat or are looking to replace a fossil fuel powered furnace and go fully electric, a CCHP will be your best option. However, if you are looking to keep the furnace as a backup, you may want to consider a dual-fuel cold climate heat pump to save energy.

If your home does not have central ductwork, there are options like a ductless mini-split heat pump. This is usually a quick installation, and backup heating sources can remain, where heat can be provided to the main areas of a home and backup sources will reach places too small to have their own pump, like in a bathroom. You can also install a single ductless mini-split for an area of the house that is never a comfortable temperature, like a basement, garage, or new addition.

Heat pumps should be properly sized for your home based on calculations done by a professional. If a heat pump is oversized, it will provide worse performance for heating and cooling than expected, as well as reduce the life expectancy of the unit. For whatever needs your home is facing, talk to a contractor who is experienced with heat pumps to identify the best options.

#### What About My New Home?

Heat pumps are a great option for a new home. For a bigger home, look into the most energy efficient option, a ground source heat pump (GSHP) or geothermal heat pump. These are the most expensive and involve a more laborious installation, but can save you more money on energy costs over the life of the system. GSHPs can be either ducted or ductless. They use the constant groundwater or earth temperature to heat and cool, rather than using the outside air like an air source pump. They can also provide hot water to your home and have been proven to last up to 50 years.



### What are the steps to buying a heat pump?

Now that you have some background on the basics of how a heat pump works and what may be the best option, it is time to dive into the key steps for buying one. While heat pumps are becoming more and more common, they are not yet the default option for many contractors and it's best not to install one in an emergency when your current system breaks. If your equipment is getting old, unreliable, loud, bills are high, temperatures aren't comfortable or you are planning to renovate, it is time to begin the process. That will give you time to make a decision on a contractor, choose the best system for your home, obtain competitive quotes, and schedule the work. First, find a quality contractor you can trust and that is experienced with heat pumps. Consider getting multiple quotes, and checking out an <u>online bill calculator</u>. From here, weigh out the options and differences like efficiency levels, warranty, size, labor and price to decide which is the best for you. Make sure to ask your contractor for information on available rebates, recommended thermostats, where they will install the unit, and if you will need electrical upgrades to accommodate the installation.

#### What if I am keeping my existing heating system as a backup?

In some cases, you may be able to use your existing furnace or electric heater as a backup. In this case, make sure your contractor sets up the system to run the heat pump until the temperature drops to a certain level so that operation of the system is as efficient as possible. This will save you money in the long run.

Are there incentives to help pay for a heat pump? There are tax credits and rebates available for heat pumps, and for electrical work to accommodate them. It's important to look at

the three levels of rebates: local level (municipal, city, state funding), utility level (ex. ComEd) and federal level (ex. Inflation Reduction Act). Efficiency ratings are often used to determine incentives. These are displayed as SEER, HSPF, EER and COP. Most rebates specify minimum efficiency levels, so it is important to clarify that your chosen heat pump is eligible before your purchase. For example, a dual-fuel configuration may be the best option for your situation, but these often don't qualify for rebates. Before your purchase, verify with your contractor what efficiency levels are needed to qualify for an incentive. While these units may be more expensive upfront, with rebates and the energy cost savings over time, more efficient units are often a better option financially. In Highland Park specifically, there are no local level funding opportunities currently available. Illinois does not offer state incentives at this time, but it's worth checking on the City and State websites as new opportunities may arise in the future. At the utility level, ComEd has done an excellent job at marketing their home heating and cooling discounts, so that upfront costs don't deter residents from improving their energy efficiency. To learn more about rebates available to you, check out <u>Rebates from the IRA</u> as well as <u>Rebates From ComEd</u>.

	Seasonal Energy Efficiency Ratio (SEER2)	Heating Season Performance Factor (HSPF2)	Energy Efficiency Ratio (EER2)	Cold Climate Coefficient of Performance at 5°F (COP)
Ducted Air Source Heat Pump	Look for SEER2 ratings above <b>15.2</b>	Look for HSPF2 ratings above <b>10</b>	Look for EER2 ratings above <b>8.1</b>	Look for ratings above <b>1.75</b>
Ductless Air Source Heat Pump	Look for SEER2 ratings above <b>16</b>	Look for HSPF2 ratings above <b>9</b>	Look for EER2 ratings above <b>9.5</b>	Look for ratings above <b>1.75</b>

#### How much will my heat pump cost to install?

The installed cost of a heat pump depends on many factors, such as whether ductwork modifications will be necessary, if electrical systems need upgrades and the complexity of the model you choose. However, the major driver of the cost is the compressor, which acts as the engine of the heat pump. All mini-split heat pumps have variable-speed compressors.

#### How will a heat pump affect my annual costs?

Switching to a heat pump should lower your energy costs, since heat pumps are more efficient than most other heating and cooling systems. How much they will impact your costs depends on your home, the quality of installation and how well sealed it is; the efficiency and age of your existing heating and cooling systems; and your current source of fuel. If your home is heated with electric resistance, you can expect savings of 50% or more in energy costs. Cold climate heat pumps are designed to run continuously, but at a low level, so the lower the speed you have it on, the more efficient they will be. Even though they run more, they should cost you less.

### How about different settings?

Whether your heat pump is ducted or ductless, to maximize your savings and make sure you are using the correct settings here are some tips:

- Avoid turning your unit off and on to control the temperature, instead practice the "set it and forget it" method. Keeping the unit running and steady will cost you less energy and money.
- In the humid summer, use the dry setting versus the cool setting to save money on over-cooling your home.
- For a ductless heat pump, make sure you keep the air vanes open so free flowing air can enter through the unit.
- In winter, when temperatures drop a lot, cold-climate heat pumps will continue to work, so don't turn them off. Just turn the fan up to a higher speed to improve efficiency and bring in more heat.

### What steps should I take to make sure my home is heat pump ready?

The better the building envelope, the more advantages your heat pump will have. If your home is air sealed and has high-quality insulation, your home will require smaller, less expensive heat pumps. This will also require less heat from the system during cooling months, which will save on heating bills. A home energy audit with a blower door test will help you identify leaky areas and places where insulation can be improved. Consider upgrading your air sealing and insulation before purchasing a heat pump. This will make your home more comfortable and ready for energy efficient upgrades. It will also ensure that your new heat pump is properly sized for your home which optimizes its performance. Because a heat pump will add significant electrical load to your house, it is possible that upgrades to the electrical system may be necessary. It's important to consult with your contractor to determine what is needed, and there may be incentives available to help reduce the cost of electrical upgrades associated with heat pump installation.

#### How long will the heat pump last?

Heat pumps consume energy and operate almost constantly, so they will require periodic servicing, maintenance and repair to guarantee they are working up to standard. It is recommended to service them about once a year. A well maintained heat pump should last 15-20 years. Some will last longer, but the performance may degrade over time. However, if you insulate and seal your home to a higher standard before installation, this insulation will require no maintenance and should last as long as one hundred years. If feasible, it's a good investment to upgrade the energy efficiency of your home and seal the envelope prior to upgrading its mechanical systems.

#### **Terms Defined**

**Air Source Heat Pump** - transfers heat from outside or inside your home rather than converting it from a fuel like a combustion heating system.

**Cold Climate (CC) Heat Pump** - uses an inverter, or variable speed drive that ensures the ability to provide heat at lower outdoor temperatures. It can efficiently heat homes as low as negative 15 degrees fahrenheit.

**Compact-ducted System** - these systems are paired with a mini-split outdoor unit. The ductwork typically serves a few rooms rather than serving the entire home.

**Energy Efficiency Rating (EER)** - An energy performance rating for cooling equipment which provides you with a ratio of useful cooling output to electricity input. The higher the EER the more cooling for every Watt of energy provided.

**ENERGY STAR** - a program run by the U.S. Department of Energy and the U.S. Environmental Protection Agency to promote energy efficiency. The logo is a symbol of certification for buildings and products that meet certain energy efficiency standards.

**Mini-split** - ductless heat pump system where the outdoor compressor is usually smaller and has a fan that discharges to the side versus the top. There may be multiple indoor units connected to the one outdoor unit.

**Multi-split** - typically has multiple indoor air handlers of ductless mini-split heat pump heads per single outdoor compressor.

**Seasonal Energy Efficiency Rating (SEER and SEER2)** - the rating of a unit's cooling output during a typical cooling season divided by total electric energy input during the same period. The higher the SEER rating, the more energy efficient it is. SEER2 is an updated rating with a few more testing requirements. This rating is usually more realistic and accurate.

**Single-Zone** - A ductless single zone heat pump (a mini-split) is a single compressor connected to a single indoor air handler, versus one outdoor unit connected to multiple indoor handlers.

#### Valuable Sources

Cold Temperature Performance Guide Online Bill Calculator ComEd Savings Calculator Electric Heat Pump Customer Buying & Operation Guide From Wisconsins' Focus On Energy Air Source Heat Pump Buying Guide Getting The Most Out Of Your Heat Pump What To Expect Once You've Installed Your Pump User Tips From Efficiency Maine Heat Pump Myths and Facts More Myths and Facts Home Energy Rebates From IRA Frequently Asked Questions For Consumers Steps to Rebates IRA Appliance Upgrade Calculator Rebates From ComEd

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