



Heat Pumps

What is a heat pump?

Heat pumps use electricity and refrigerants to transfer heat from outside air (air-source) or from the ground (ground-source) to indoor air, delivering heating or cooling (when the process is reversed). Heat pumps can also be used to heat water.

Benefits of heat pumps:

- **Comfort:** Heat pumps provide higher levels of comfort because they don't dry out indoor air and circulate heat around a space, causing less variation in indoor temperature compared with a furnace.
- Utility bill savings: According to the Department of Energy, 90% of households save money on their utility bills by retrofitting with the right heat pump. As an example, in Michigan, homes using propane, fuel oil, and electric resistance heating could see savings upwards of \$1,500 annually with a heat pump. Combined with energy efficiency measures like air sealing, customer can reduce the size of the new system they need, lowering the up-front cost. As natural gas rates rise from the costs of overbuilt infrastructure, customers will see savings into the future.
- **Climate and health benefits:** Heat pumps reduce indoor and outdoor air pollution and are more efficient than gas furnaces. Heat pumps don't burn fuel in the home like gas furnaces, which pump combustion fumes linked to climate change, lung, heart, and reproductive harms into the air. Illinois' grid is actively transitioning to renewables, making electricity the cleanest, safest way to deliver heat to homes.

Types of heat pumps and how they work:



- Thermal energy from the sun is stored in the ground, where temperatures remain relatively constant throughout the year. Ground source or geothermal heat pumps (GHPs) use a network of pipes with water and antifreeze to transfer this energy to heat or cool a space. Thermal energy networks (TENs) are connected systems of multiple GHPs that provide extremely efficient neighborhood-scale heating and cooling. While having a higher up-front cost today, a GHP can have as little as 1/3 the operating cost of air-source heat pumps over its lifetime.
- According to the DOE, GHPs have the added benefits of incentivizing local job creation in the drilling and HVAC sectors and also act as a grid-cost reduction tool.



- Ducted air source heat pumps are connected to central ductwork, just like a central AC system, whereas ductless operate like space heating or cooling. Both can be "mini-split," meaning they have both an outdoor unit that collects thermal energy and an indoor unit that delivers the energy.
- Air source heat pumps are used in almost all parts of the country, but new advances in cold-climate air source heating technologies have led to increased adoption in colder climate regions like the northeast, performing well down to -13 degrees Fahrenheit, and some as low as -22 degrees Fahrenheit.

IRA incentives for heat pumps:		
Incentive type	Amount and Eligibility	Qualifying technology
<u>Tax credit</u>	30% of cost, up to \$2,000 per year for any homeowner. Up to \$2,500 (and up to \$5,000 for DOE ZERH certification) for multifamily buildings that meet federal prevailing wage requirements	 Air source heat pump Ground source heat pump Heat pump water heaters
<u>Home Energy</u> <u>Rebates</u>	Up to \$14,000 for households earning below 80% Area Median Income (AMI) Up to \$8,000 depending on income and project's energy savings on efficiency upgrades	 Air source heat pump Ground source/geothermal heat pump Heat pump water heaters Electric panel or wiring Insulation, air sealing or ventilation

