

HOW HEAT PUMPS WORK

You already have a heat pump in your home - your refrigerator! But how exactly do they work to heat our homes?



HEAT PUMPS DON'T MAKE HEAT, THEY MOVE IT.

Much like your fridge extracts heat from inside and ejects it through the coils on the back, a heat pump extracts heat from the outside air, concentrates that heat energy, and circulates it throughout your home.

THEY ARE EFFICIENT

Electric heat pumps are 200-300% efficient. How is that possible?

By extracting heat from outside air, they provide more heat than the electricity needed to move and concentrate it.

In contrast, gas furnaces are 75%-98% efficient and electric baseboard heating is 100% efficient; meaning 75-100% of the energy you pay for is used to make heat.

THEY CAN HANDLE THE COLD

Heat pumps have been used in other parts of the world for decades. Recent advancements in cold climate heat pumps have made them a practical option across Canada

THEY CAN WORK IN ANY HOME

Ductless heat pumps can be installed in any home. There are also models that can replace your furnace or work with your radiant heating system. "The Types of Heat Pump Systems" resource covers this in detail.

THEY ALSO PROVIDE COOLING

In summer the heat pump can be reversed to provide cooling. A major benefit as climate change models predict more extreme weather including hotter summers.

With cool air from your heat pump there is no need to open windows, an added benefit when extended heat spells or wildfires cause poor air quality.

WHY NOT GROUND SOURCE HEAT PUMPS?

While it's essentially the same technology, ground-source heat pumps are expensive on the North Shore given our rocky ground.

**Want to know more?
Keep reading.**

How exactly do heat pumps work? Here are the highlights.



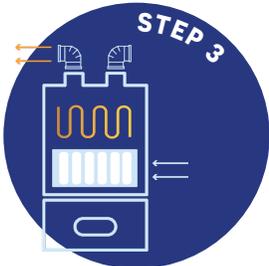
EXTRACT HEAT ENERGY

A cool liquid flows through the outdoor coils in the condensing unit, absorbing heat energy from outside air. Heat pumps can extract heat from air as low as -30°C .



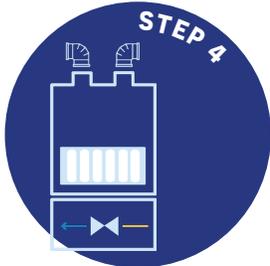
CONCENTRATE HEAT ENERGY

The warm gas then moves through a compressor in the condensing unit, concentrating the heat energy into a hot liquid. The hot liquid is then pumped inside.



DISTRIBUTE THE HEAT

Air (or water) moves across the hot liquid flowing through the indoor coils, absorbing the heat, and then circulating it through your home using either an air handler unit through duct work or pumped hot water through radiant heating loops.



BACK TO THE START

The transfer of heat into your home cools the liquid in the heat pump loop. The cooler liquid then passes through an expander unit, moving from high pressure to low pressure and decreasing the temperature. Then the cycle repeats.

Check out this [video](#) from BCIT's Zero Energy Buildings Lab for more of the science behind heat pumps.



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HEAT PUMP**