

January 31, 2024

Heat Pumps 101: Is a Heat Pump System Right for You?

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Who is Efficiency Vermont?

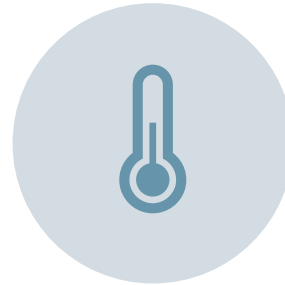
- Statewide energy efficiency utility
- Reduce the cost of energy for all Vermonters
- Help families, businesses, and institutions understand and make better use of energy and reduce greenhouse gases



What we want you to know:



Heating system fundamentals



What a heat pump is, and how it works.



The types of heat pumps that could be suitable for your home.



Next steps, questions for contractors, and available resources

A good place to start:

What are your goals?

What are your comfort needs?

What is your house like?

What is your distribution system?

How much weatherization has been done?

What is your budget?

Fuel-fired heating systems

High temperature distribution via air or water

Do not provide cooling

Can be subject to volatile fuel pricing

Carbon emissions and other air pollutants related to combustion



What about heat pumps?



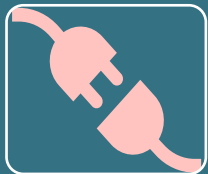
Heat Pump Characteristics



Run on electricity



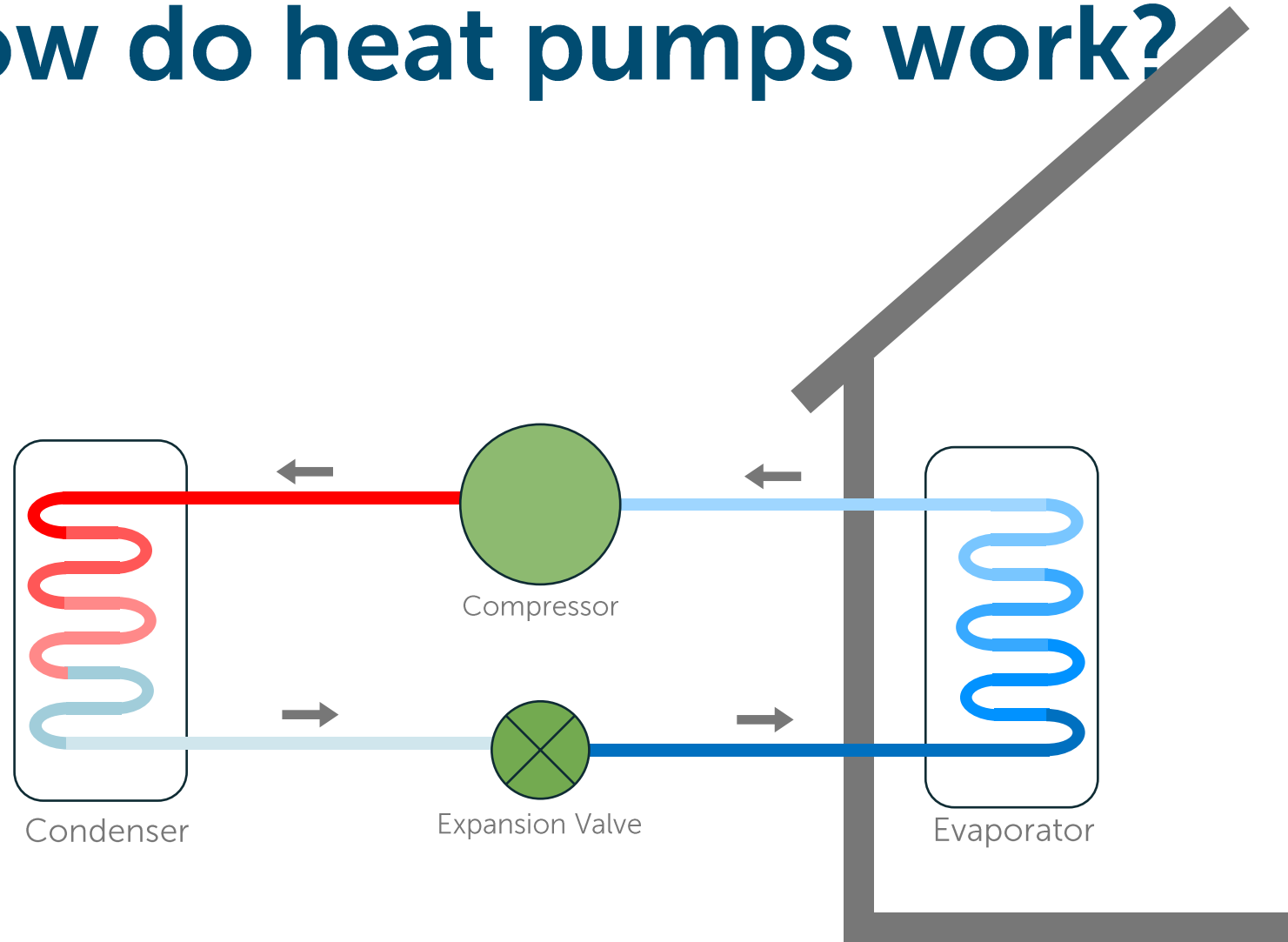
Can provide cooling



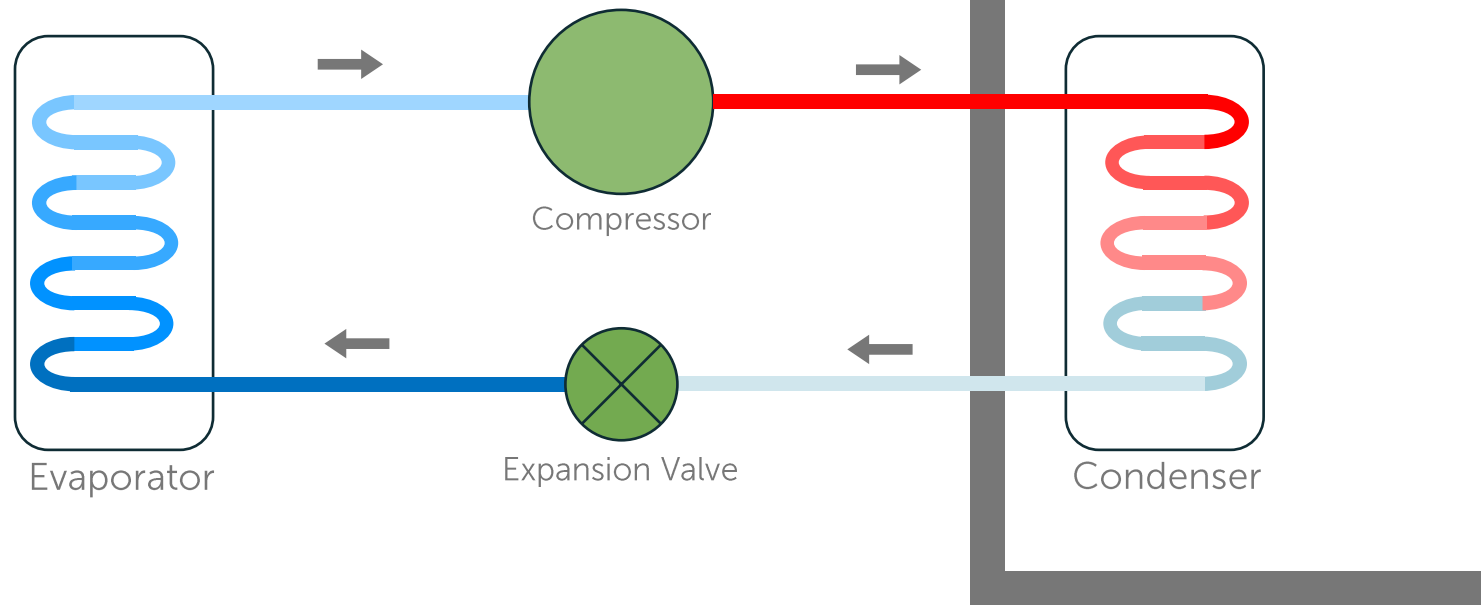
Much more efficient than electric resistance heating



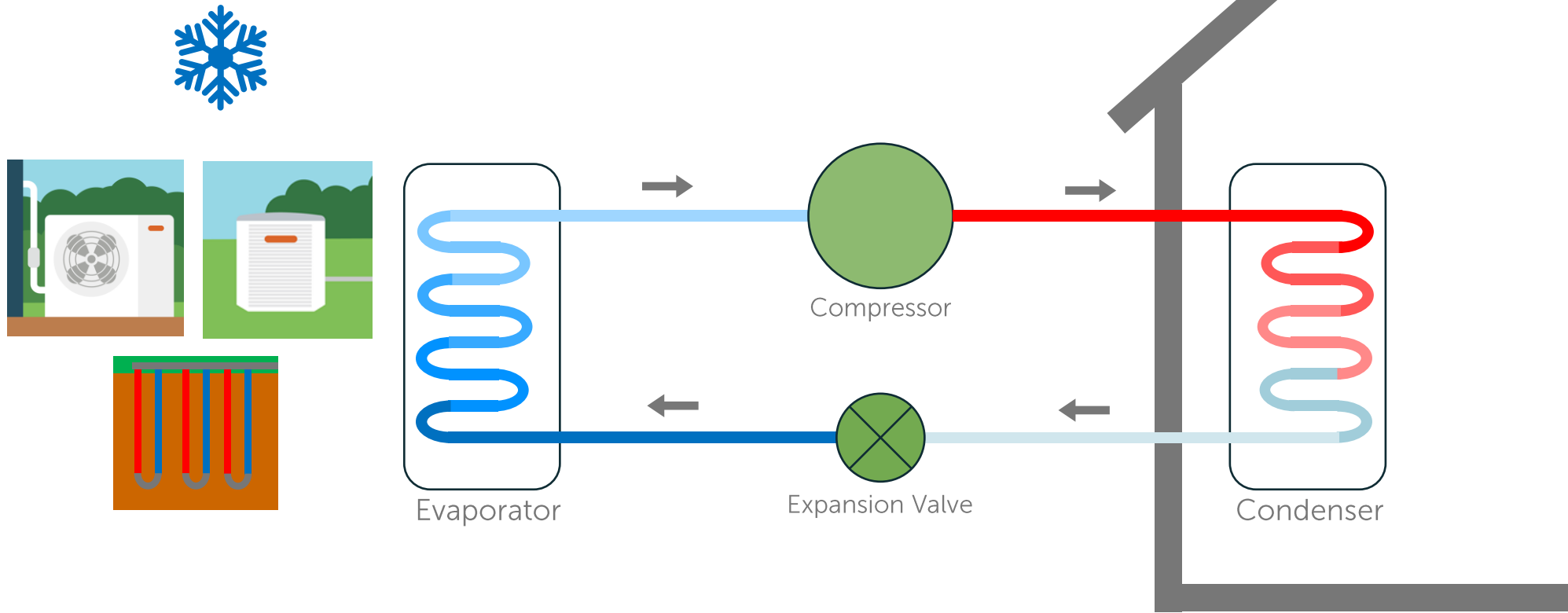
How do heat pumps work?



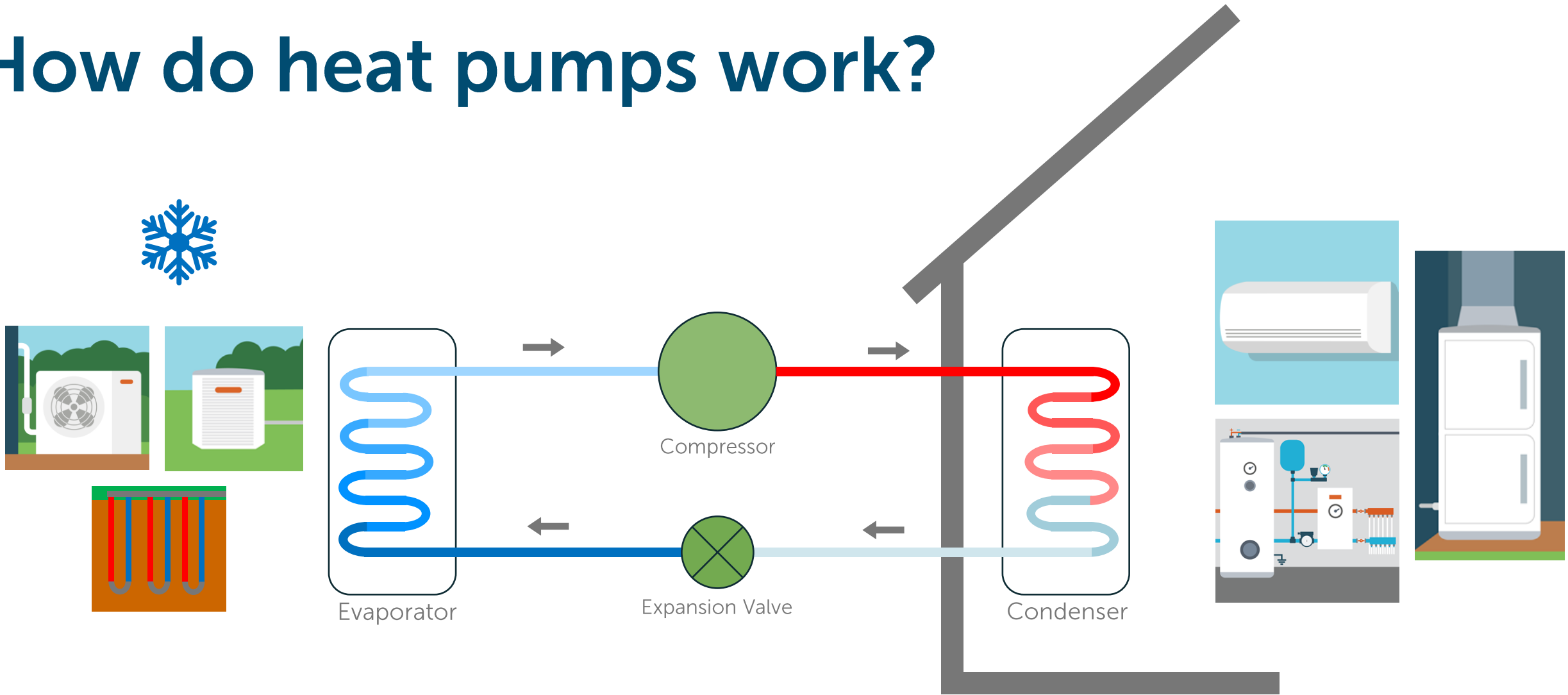
How do heat pumps work?



How do heat pumps work?



How do heat pumps work?



Heat pumps work...

Even in the cold Vermont winters, a well-designed heat pump system can heat your home *even when it is below zero.*



...but which one is right for your home?

Ductless

Ducted

Air-to-Water

Ground Source



Ductless Heat Pumps

Efficiency
Vermont



Ductless Heat Pumps

AKA heat pumps, 1-to-1 heat pumps, mini-split heat pumps, multi-split heat pumps, multi-zone heat pumps.

Each indoor head delivers heat into one space.

Typically, more than one is required to heat an entire home.



Ductless Heat Pumps

 Least expensive option, typically.

 Fast install.

 Versatile in different types of homes.

 Useful for partial fuel switching.

Ductless Heat Pumps



Least expensive option, typically.

For a complete fuel switch, your home likely needs to be weatherized.



Fast install.

Often requires tolerance for temperature variation.



Versatile in different types of homes. Often visibly prominent.



Useful for partial fuel switching.

Where do ductless heat pumps work well?

Pairs well with weatherization projects.

Homes with simple layouts, open floor plans, and few bedrooms.

Homes with existing wood heating/zoned central heating.

Adding heating/cooling to a particular room.



Ducted Heat Pumps

Efficiency
Vermont

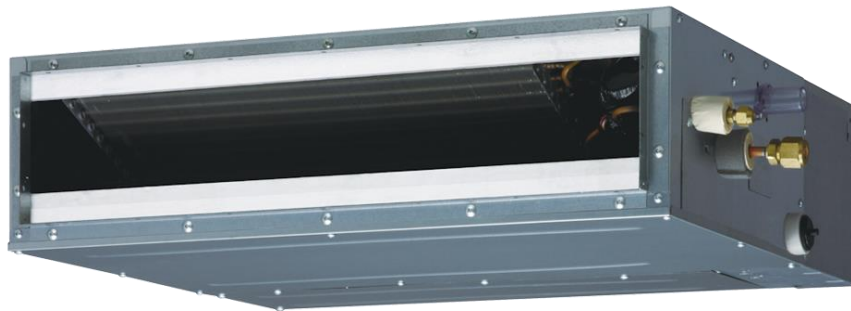


Ducted Heat Pumps

AKA Central Heat Pumps

Two types:

- Central ducted
- Compact ducted



Ducted Heat Pumps

Sometimes, can take advantage of existing ductwork.

In-line air filters.

Helpful for reaching smaller rooms.

Ducted Heat Pumps

Sometimes, can take advantage of existing ductwork.

In-line air filters.

Helpful for reaching smaller rooms.

Typically, more expensive than ductless.

In many cases, existing ducts must be altered or replaced.

Not suited for homes that cannot have ducts.

Where do ducted heat pumps work well?

Homes with unfinished basements allow space for air handlers and ductwork.

Pairs well with more robust interior renovation.

Reaching multiple small rooms.



Air-to-Water Heat Pumps



Air-to-Water Heat Pumps

A whole-house heat pump system, typically used with hydronic distribution.

Offers an option for those interested in radiant heating.



Air-to-Water Heat Pumps



Whole-house systems.



Potential for also providing domestic hot water, depending on design.



Depending on the home, you may be able to use existing distribution infrastructure.

Air-to-Water Heat Pumps



Whole-house systems.

Not typically plug-and-play with existing distribution.



Potential for also providing domestic hot water, depending on design.

Installing or replacing hydronic distribution can be time-consuming and expensive.



Depending on the home, you may be able to use existing distribution infrastructure.

If cooling is desired, ductwork is typically required.

Where air-to-water heat pumps work well

Homes that already have low-temperature emitters, such as radiant flooring or specialized radiators.

Homes with appropriately zoned distribution

These are often central systems – typically included in more involved retrofits.



Ground Source Heat Pumps





Ground Source Heat Pumps

AKA GSHP, Geothermal heat pumps

All GSHPs use the stable temperatures of the earth or water as their heat source, rather than air.

These systems include outdoor infrastructure, a water pump, the heat pump unit, and indoor distribution infrastructure.

Can be used with forced air or hydronic distribution systems that are designed for *low temperature*.



Ground Source Heat Pumps

Can operate with very high efficiencies when properly designed

Provides consistent temps for heating and cooling all year.

With low-water-temperature distribution, it can be possible to retrofit into existing heating and cooling systems.

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Provides consistent temps for heating and cooling all year.

With low-water-temperature distribution, it can be possible to retrofit into existing heating and cooling systems.

Often, GSHPs are the most expensive whole-house option.

Requires significant drilling or excavation and specific site conditions.

Requires more detailed design

Where do ground source heat pumps work?









Generally, these systems scale better in larger homes ready for a significant heating retrofit

Homes with appropriate site conditions for drilling or excavation

You will need low-temperature distribution: radiant flooring or panel radiators, multiple heating zones.



Summary

Heat Pump Type	System Type	Distribution	Complexity	Cost to Install
Ductless	Decentralized	None		
Ducted	Central or decentralized (compact)	Ducts		
Air-to-Water	Central	Hydronic typically (ducts for cooling)		
Ground Source	Central	Hydronic or ducts (cooling)		

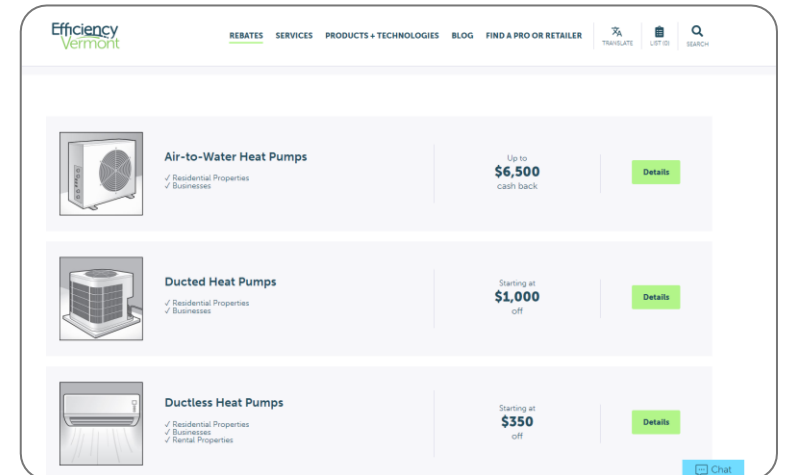
How to Get Started

Contact us for customer support, technical questions, and Virtual Home Energy Visits.

Look for Efficiency Excellence Network contractors and consider comprehensive weatherization: EfficiencyVermont.com/Pro

Learn more about heat pump rebates from Efficiency Vermont and your utility:
EfficiencyVermont.com/Heat-Pumps

- Additional rebates are available for eligible flood-impacted customers – see EfficiencyVermont.com/FloodRebate



The Heat Pump Rebate process

1. Determine the best HP system for your home
2. Your contractor purchases your HP from a participating retailer (point-of-sale rebate applied)
3. Your heat pump is installed
4. Apply for any additional rebates from your utility
5. If eligible, file for any applicable federal income tax credits with a tax professional

Financing Options

Home Energy Loan

Starting at 0% interest

No minimum loan amount

Finance up to \$20,000

Eligible projects:

- weatherization
- heat pumps
- heat pump water heaters
- wood heating systems
- ENERGY STAR appliances

EfficiencyVermont.com/Financing

Weatherization Repayment Assistance Program (WRAP)

Pay for a project monthly on your utility bill.

Heat pumps can be financed when paired with weatherization.

Reduces or eliminates upfront costs

Restrictions apply, including 12 months of positive bill payment with a participating utility (Burlington Electric Department, Green Mountain Power, Ludlow Electric, Vermont Electric Coop, and VGS)

Questions?



Next steps? Engage your neighbors



Spreading the Word



Talk to people in your community. Tell them why this is important to you



Engage your community where they already are (farmers markets, craft fairs, community events)



Frame efficiency and rebates as saving money first, and the planet second



The path to heat pumps is paved with "baby steps" around air sealing, weatherization, and education

Online resources

Efficiency Maine – Compare Home Heating Costs

- <https://www.efficiencymaine.com/at-home/heating-cost-comparison/>






Rewiring America Savings Calculator

- <https://www.rewiringamerica.org/app/ira-calculator>

- all of this information is ALSO on Efficiency Vermont's website

- ex: heat pump rebates


Your electric utility provides the funding to make this discount possible:




REBATES | AVAILABLE REBATES

Ductless Heat Pumps

Hire a contractor and get a \$350-\$450 instant discount on qualifying models at a participating distributor, plus a bonus for income-eligible Vermonters. You may also be eligible for federal tax credits to help offset the cost of these projects.


 In partnership with your utility, this program supports the reduction of greenhouse gases. [Learn more.](#)


 The \$400 instant discount and \$300 moderate-income bonus for GMP customers is for purchases on or before 12/31/2023.

STARTING AT
\$350
off

[Find a Pro](#)

[Find a Distributor](#)





ABOUT THIS REBATE			RELATED CONTENT
Eligibility	+		Is a heat pump heating & cooling system right for you?
How To Redeem	+		8 ways not to use a heat pump
Partner Offers	-		Integrated Controls Rebate
Partner	Additional Offer	Details	
Burlington Electric Department	up to \$2,900	Post purchase rebate	
Federal Tax Credit for tax years 2023-2032	30% of cost, up to \$2,000 per year	Federal Tax Credit details & eligibility	
Green Mountain Power	up to \$2,000	Low-income bonus	
Vermont Electric CO-OP	\$150 thermal bonus	Bill credit	
Municipalities served by VPPSA	\$200 weatherization rebate	Post-purchase rebate	
Village of Enosburg Falls Water & Light Department, Village of Johnson Water & Light Department, Village of Ludlow Electric Light Department, Village of Orleans Electric Department	\$1,000	Income bonus	
Washington Electric CO-OP	\$100	Rebate	

Efficiency Vermont resources

Posters, flyers, and more on our [Partner Resources page](#)

- [Cold Climate Heat pumps: Are they right for you?](#) flyer
- [Top 8 Ways NOT to use a heat pump](#) flyer
- [Home Energy Loan](#) flyer

Efficiency Vermont's Website

- "How-To" guides and explanations
- Blogs with customer stories from real Vermonters
- Up-to-date resources and rebates
- Subscribe to our newsletter to hear the latest

Help people get started with a [Home Energy Assessment](#)

["Find-A-Pro" digital tool](#) to find contractors in your area

Retail Marketplace - Compare efficient products

<http://www.efficiencyvermont.com/Shop>

Schedule of in-person & and digital educational events



Heat Pumps: A Hot (and Cool) Technology

What is a heat pump?
It's an advanced-technology air conditioner that can also efficiently heat your home or business in winter. Heat pumps and air conditioners cool the same way, by using electrical energy to move heat from inside to the outdoors. But a heat pump has a reversing switch that lets you change its function from cooling to heating in winter—with the press of a remote control button.

Ducted Heat Pumps
✓ Residential Properties
✓ Businesses
Starting at **\$1,000** off

Ductless Heat Pumps
✓ Residential Properties
✓ Businesses
✓ Rental Properties
Starting at **\$350** off

Efficiency Vermont

A little bit more about Efficiency Vermont ...



Upstream
Supply Chain
Engagement



Education,
Promotion &
Events



Rebates,
Incentives &
Financing



Engineering,
Project Support
& 1:1 Guidance



Statewide
Partnerships

Thank you!

(888) 921-5990

20 Winooski Falls Way, 5th Floor

Winooski, VT 05404

Efficiency
Vermont

Find a Pro or Retailer

Efficiency Excellence Network

- Contractors, installers, and retailers trained to deliver the highest-quality efficiency technologies and services
- Vetted and managed by Efficiency Vermont
- Find a member:
www.efficiencyvermont.com/Pro

