

Welcome to the Efficiency Maine Annual Heat Pump Basics Module.

Agenda

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
7. Placement
8. Installation
9. Operation
10. Other Considerations



This module is divided into 10 sections. You need not complete all sections at once -- simply come back to the training module and pick up where you left off. However, if you leave in the middle of a section, when you return you'll have to start that section over so it's best to take breaks after you click on the "next lesson" button at the end of a section.

This training will cover an introduction of Efficiency Maine, including rebates and loans, and we'll explain becoming a registered residential vendor or a commercial qualified partner.

Next we'll address heat pump myths and facts, selection, sizing, placement, insulation, operation, and some other heat pump considerations.



The first section is an introduction to Efficiency Maine.

About Efficiency Maine

- Efficiency Maine offers rebates, loans, brochures and marketing support designed to motivate customers to call our Residential Registered Vendors.
- Efficiency Maine funding requires that rebated installations be cost-effective.
- Cost-effectiveness of heat pumps depends on proper placement, sizing, selection, installation, and user training.



1. Introduction - 1

Efficiency Maine offers rebates, loans, sales brochures, and technical information to help residential and commercial trade allies sell and install energy efficiency products. Efficiency Maine offers rebates, loans, brochures and marketing support designed to motivate customers to call our Residential Registered Vendors.

Restrictions on our funding require all rebated installations be cost-effective. Unlike an LED bulb or ENERGY STAR clothes washer, the cost-effectiveness of a heat pump depends a lot on its placement, sizing, selection, installation, and use.

Transition to Efficient Heating and Cooling Systems

- **State Goals:**

- Install at least 100,000 new heat pumps in Maine by 2025,
- Ensure that by 2030, 130,000 homes are using between 1-2 heat pumps and an additional 115,000 homes are using a whole-home heat-pump system.
- Install at least 15,000 new heat pumps in income-eligible households by 2025.

- **Objectives:**

- Lower heating bills
- Achieve carbon reductions and displace heating oil
- Grow the Maine economy by lowering the cost of heating and adding jobs to sell and install heat pumps
- Benefit all sectors, all income levels, and all geographic areas of the state.



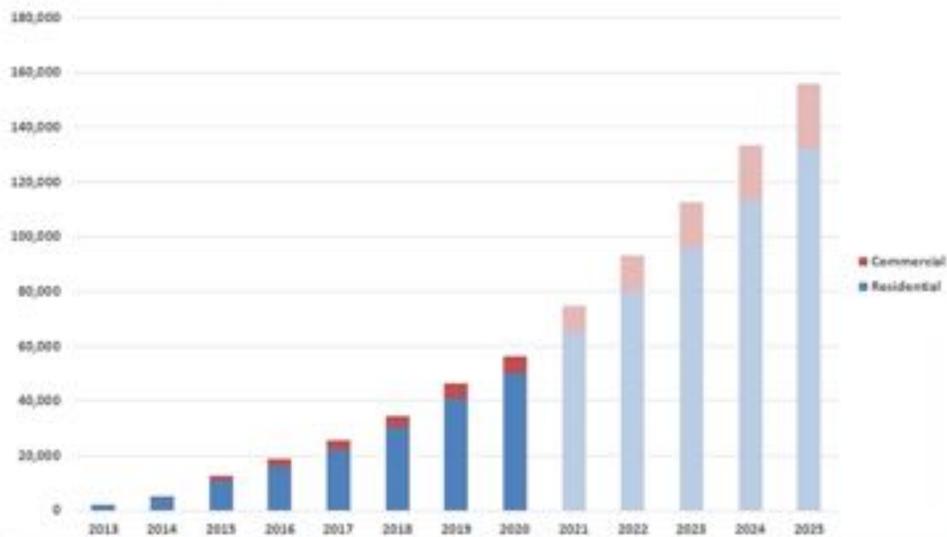
1. Introduction - 2

Heating, cooling, and lighting of buildings are responsible for almost one-third of Maine's greenhouse gas emissions. Maine has recently set targets to help the state transition to cleaner heating and cooling systems. These include

- A target in state statute to promote the installation of at least 100,000 new heat pumps in Maine by 2025; and
- A target in Maine's climate action plan to achieve, by 2030, 130,000 homes using between 1-2 heat pumps and an additional 115,000 homes using a whole-home heat-pump system.

The climate action plan also calls for the installation of at least 15,000 new heat pumps in income-eligible households by 2025.

Cumulative Heat Pump Installations



1. Introduction - 3

This graph gives you an idea of the opportunity before us. As of 2020, tens of thousands of heat pumps have been installed in homes and businesses across Maine..

But, as you can see, we're going to need to grow that number considerably to meet the state's targets.

About This Video

- Efficiency Maine inspects thousands of heat pump installations done by hundreds of installers each year.
- This video is intended to share those best practices.
- This video is **not** intended to replace industry training.



1. Introduction - 4

That's where you come in and why we've asked you to view this video every year so you can continue to meet our rebate program eligibility requirements.

As you know, Efficiency Maine inspects thousands of heat pump installations each year and observes the very best practices.

This video is intended to share those best practices.

We plan to update it on an ongoing basis to make sure all Residential Registered Vendors receive the benefit of what we learn.

However, this video is not intended to replace industry training or what installers learn from working alongside more experienced peers.

Next Section

1. Introduction
- 2. Rebates and Loans**
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
7. Placement
8. Installation
9. Operation
10. Other Considerations



This is the end of the introduction. To move ahead to the next section on Rebates and Loans, click the “Next Lesson” button below this video window.



This section will cover Efficiency Maine rebates and loans.

Heat Pump Rebates

	Market	Minimum HSPF	1st Indoor Unit	Additional Indoor Units	Max Rebate
1	Residential <u>Tier 1</u>	10.0 for multi-zone 12.0 for single-zone	\$400	\$200	\$600
2	Residential <u>Tier 2</u>	12.5 single-zone	\$800	\$400	\$1,200
3	Low-income LIHEAP and Assessed Value	13.0 single-zone	\$2,000	\$400	\$2,400
4	Commercial & Industrial	12.0 for single-zone 10.0 for multi-zone	\$500	\$250	\$1,250
5	Small Business	12.5 single-zone	\$1,600	\$1,600	\$4,800



Max two rebates per home.
Commercial maximum is per heat pump. No limit on number of heat pumps per building.

2. Rebates and Loans - 1

We offer rebates up to \$2,400 per home and up to \$1,600 per heat pump in commercial buildings. There's no cap on the number of heat pumps that can be installed in a commercial building. Rebates are only available for heat pumps that are installed by Residential Registered Vendors or commercial Qualified Partners.

For more details on rebates and eligibility criteria please visit efficiencymaine.com.

Residential Heat Pump Loans

- Up to \$15,000
- 4.99% to 5.99% APR
- Up to 15-year terms
- Connect your customers:
 - [Efficiency Maine Loans webpage](#)
 - Free Efficiency Maine [home energy loan brochure](#)
 - Register for loan portal ID and password by calling 866-376-2463
 - Only available to Residential Registered Vendors



2. Rebates and Loans - 2

In addition to rebates, we have residential heat pump loans.

In addition to rebates, we have residential heat pump loans.

Customers can borrow up to \$15,000 at a 4.99 to 5.99 percent Annual Percentage Rate with up to 10-year terms.

Residential Registered Vendors interested in offering Efficiency Maine loans to their customers can contact us to get their own loan website login ID and password.

Next Section

1. Introduction
2. Rebates and Loans
- 3. Becoming a Residential Registered Vendor or Commercial Qualified Partner**
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
7. Placement
8. Installation
9. Operation
10. Other Considerations



This completes the section on rebates and loans. Click the “Next Lesson” button to advance to the section on “Becoming a Residential Registered Vendor or Commercial Qualified Partner.”



Section 3 covers Becoming a Residential Registered Vendor or Commercial Qualified Partner under Efficiency Maine's programs.

Residential Registered Vendor

Benefits

- Access to Rebates and Loans
- Exposure on Efficiency Maine's Vendor Locator
(40,000 visits/year)
- Free brochures
- Monthly program updates newsletter

Requirements

- Participation Agreement / Code of Conduct
- General Liability Insurance
- Workers' Compensation Insurance
- One member of each heat pump installation crew will need:
 - [EPA Section 608 Certification](#).
 - Heat pump installer training provided by a manufacturer of ENERGY STAR® heat pumps, or an [Efficiency Maine Registered Trainer](#).
 - The certificate from this one-hour, free [Efficiency Maine Annual Heat Pump Basics](#) training video.



3. Becoming a RRV or QP - 1

Some of the benefits of being a Residential Registered Vendor -- also referred to as an RRV -- are access to rebates and loans as a tool for selling upgrades, as well as exposure on our website's Vendor Locator, free brochures, and a monthly program update e-newsletter. There is no fee to register.

To give you an idea of how our marketing can benefit you, in a typical year, Efficiency Maine runs ads in newspapers and magazines, and on Google, Facebook, and radio that reach millions of readers and listeners statewide. Our website receives more than 125,000 in-state visits per year and 40,000 searches on our Vendor Locator tool.

Efficiency Maine requires RRVs to sign the Efficiency Maine participation agreement and code of conduct document, and have general liability and workers' compensation insurance.

In addition, there are three heat-pump- specific requirements. One member of each heat pump installation crew must have:

- [EPA Section 608 Certification](#).
- Heat pump installer training provided by a manufacturer of ENERGY STAR® heat pumps, or an [Efficiency Maine Registered Trainer](#).

The certificate from this one-hour, free [Efficiency Maine Annual Heat Pump Basics](#) training video.

Commercial Qualified Partner

Benefits

- Technical information and advice
- Sales calls between Qualified Partners and Efficiency Maine field personnel
- Online application submittal
- Promotional materials
- Limited co-op advertising assistance
- Free or discounted access to all Efficiency Maine training programs
- Direct access to Program Delivery Team for technical information and project enrollment support
- Access to exclusive Efficiency Maine Qualified Partner website

Requirements

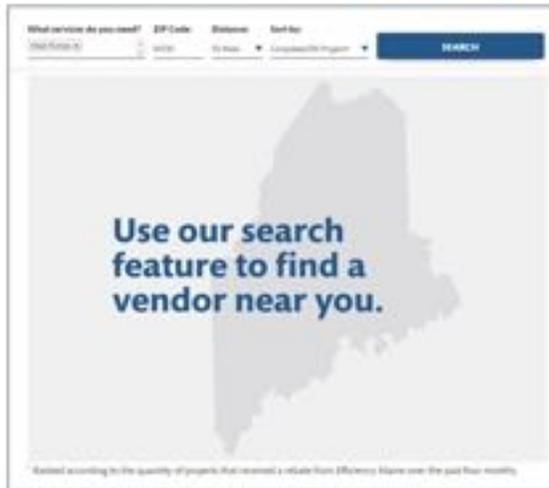
- Signed Partner Expectations
- Completion of Training Webinars
- Proof of Insurance
- US EPA Section 608 Refrigerant Handling Certificate (Type 2 or Universal)
- State of Maine Master Electrician License



3. Becoming a RRV or QP - 2

The benefits of becoming a Commercial Qualified Partner are similar and will allow you to access heat pump rebates for your commercial customers. The requirements for becoming a Qualified Partner are outlined here. You can register to become a Qualified Partner or Residential Registered Vendor -- or both -- on the Efficiency Maine website.

Residential Registered Vendor and Qualified Partner Locator Tools

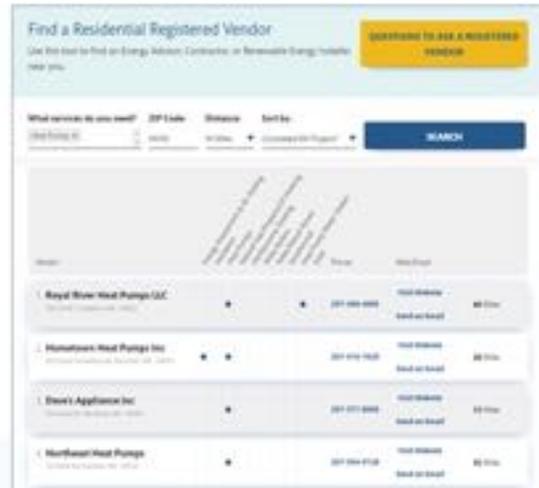


What services do you need? ZIP Code Distance Sort by

SEARCH

Use our search feature to find a vendor near you.

*Ranked according to the quantity of projects that received a rebate from Efficiency Maine over the past four months.



Find a Residential Registered Vendor

Use this tool to find an Energy Solution Contractor or Renewable Energy Installer near you.

QUESTIONS TO ASK A REGISTERED VENDOR

What services do you need? ZIP Code Distance Sort by

SEARCH

Name	Phone	View Profile
Royal River Heat Pumps LLC 10000 Main Street, Royal River, ME 04963	207-888-8888	View Website Send us Email 88 Miles
Honestwork Heat Pumps Inc 10000 Main Street, Royal River, ME 04963	207-888-8888	View Website Send us Email 88 Miles
Best's Appliances Inc 10000 Main Street, Royal River, ME 04963	207-888-8888	View Website Send us Email 88 Miles
Northwest Heat Pumps 10000 Main Street, Royal River, ME 04963	207-888-8888	View Website Send us Email 88 Miles



3. Becoming a RRV or QP - 3

To help customers find Residential Registered Vendors and commercial Qualified Partners we have locator tools on our website. Over 40,000 visitors use our vendor locator search tool each year.

Free Heat Pump Sales Tools

Brochures

- Introduction to Heat Pumps brochure
- Heat Pump Rebate brochure
- Heat Pump User Tips
- Quick Guide to Home Heating brochure

Website

- Cost of Home Heating calculator and table
- Heat Pump Installation Considerations
- Frequently Asked Questions
- Heat Pump User Tips webpage and video
- List of Most Commonly Rebated Residential Heat Pumps



3. Becoming a RRV or QP - 4

To help you with marketing, Efficiency Maine has several free heat pump brochures, including an overview of heat pump technology, information about rebates, and heat pump user tips.

Efficiency Maine also offers a “Quick Guide to Home Heating” brochure that helps customers compare the annual cost of heating with a heat pump to other heating systems.

You can download these from our website or if you’d like free, professionally printed copies, call our Call Center at 866-376-2463.

Residential Installation Requirements Checklist

- Must be followed on every installation.
- Some of the things later in this presentation show up on the checklist as requirements in order for heat pumps to be eligible for rebates. They are indicated as follows:

★ Efficiency Maine Installation Requirements Checklist

RESIDENTIAL HEAT PUMP Installation Requirements Checklist

Customer Name: _____
Street Address: _____

Requirements for rebate eligibility. Check boxes that need to be submitted, but all items are required.

Requirement ID	Requirement	Minimum	Maximum	Installation
★ 1	Located in a room that is equal to or larger than the room protected from view			
2	Located in a room			
3	Line set installed with weather proofing in place			
4	Refrigerant seal or clamp			
5	Flammable gas not used to purge air line pipes and air charging			
Checklist				
Manufacturer specifications met: <input type="checkbox"/> Yes <input type="checkbox"/> No				
Actual line set length: _____				
1. Refrigerant added. Provided by manufacturer: <input type="checkbox"/> Yes <input type="checkbox"/> No				
2. Use all approved air conditioning guidelines (R-22 alternative below)				
	REQUIRE TO	RECOMMEND TO	RECOMMEND TO	RECOMMEND TO
	Minimum	4,000 BTU/h	6,000 BTU/h	8,000 BTU/h
	Maximum	12,000	18,000	24,000
3. Have installation completed using manufacturer's correct specifications				
4. Check for air leaks through air conditioner condenser and evaporator coils (except for split system air conditioning units)				
5. Use air filters with correct pleats and a rated MERV rating				
6. Properly seal and weatherproof exterior doors				
7. Check for proper installation of air conditioning				
8. Check for proper installation of air conditioning				
Notes				
1. Add				
2. If not checked, installation is not complete				



3. Becoming a RRV or QP - 5

One key document that acts as the foundation for this training -- and that we will refer to throughout -- is the Residential Heat Pump Installation Requirements Checklist.

The checklist must be completed for every residential heat pump rebate.

As we go through this presentation, we've placed a red star next to the mandatory items.

Residential Quality Inspections

- Inspection of 10-15% of installations to ensure program compliance
- Find/share best practices
- Homeowners can opt in/out
- Based on Installation Requirements Checklist
- Corrective action may be required to remain an active Residential Registered Vendor
- Homeowner decides if inspection report shared with installer



3. Becoming a RRV or QP - 6

Finally, we have a team of field inspectors that visit 10 to 15% of residential heat pump installations to ensure that installations comply with our program guidelines. Field inspectors also look to find and share best practices with all installers. This helps us improve quality standards in the industry.

This free offering is available to all participating homeowners.

Efficiency Maine inspectors use the Installation Requirements Checklist as the basis of their inspections. An inspection report is always shared with the homeowners and, with the homeowner's permission, those reports may also be shared with the installer.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
- 4. Heat Pump Myths and Facts**
5. Selection
6. Sizing
7. Placement
8. Installation
9. Operation
10. Other Considerations



This completes the section on becoming a trade ally in Efficiency Maine Programs. Click the “Next lesson” button below to move to the next section on heat pump myths and facts.



4. Heat Pump Myths and Facts

One of the things that you know as a heat pump installer is that there are a lot of misconceptions about the technology, even with more and more people installing them in their homes and businesses. Let's go over a few of the more common myths so you have more resources to share with your customers when they come up.

Myth: “Heat pumps need backup in the cold”

Facts:

- High-performance units that qualify for Efficiency Maine rebates work well in cold weather.
- Some are rated to work down to -15°F or lower.
- Although their capacities drop at low temperatures, some can produce over 100% of rated capacity at -15°F. A properly sized unit will keep occupants warm all winter.



4. Heat Pump Myths and Facts - 1

That fact is that as long as a heat pump system is properly designed, there should be no need for backup. Some heat pumps work at temperatures as low as negative 15 degrees Fahrenheit. It is increasingly common for new houses to be heated and cooled exclusively with heat pumps. Older homes are also converting exclusively to heat pumps.

Myth: "Heat pumps aren't efficient in the cold"

Facts:

- Although they get less efficient at lower temperatures, even at -15°F, qualifying heat pumps are far more efficient than any combustion system.
- Even at temperatures near and below 0°F, rebate-eligible heat pumps can be nearly 200% efficient.



4. Heat Pump Myths and Facts – 2

Though they lose efficiency as the outdoor temperature drops, even at temperatures near zero degrees Fahrenheit, rebate-eligible heat pumps can be nearly 200% efficient.

This is far more efficient than any combustion systems.

Myth: “Heat pumps only work in superinsulated homes”

Fact:

- Properly sized units work well in almost any residential space.



4. Heat Pump Myths and Facts – 3

While it is important to have a well insulated home, a properly sized heat pump can be used to heat virtually any home.

Tens of thousands of Maine homes successfully heat with heat pumps and most are not superinsulated.

Myth: "Multi-zone systems cost less than multiple single-zone units"

Facts:

- Multi-zone systems typically cost more to operate.
- After rebates, single-zone systems can cost less to install.



4. Heat Pump Myths and Facts – 4

Myth: Multi-zone systems cost less than multiple single-zone units.

Multi-zone systems typically cost more to operate, and with the higher rebates available for single-zone systems, they can cost less to install.

Myth: "Turning down heat pumps at night saves energy"

Facts:

- This is not true for heat pumps.
- "Set it and forget it" is the most efficient way to operate a heat pump.



4. Heat Pump Myths and Facts - 5

While this is true for furnaces and boilers, it is not true for heat pumps. Heat pumps save the most energy when allowed to maintain a constant temperature. In fact, a Department of Energy study from 2015 found that leaving the thermostat at a constant temperature uses roughly half the amount of energy as nightly setbacks.

That's why we recommend that people, "set it and forget it."

Myth: "To maximize overall efficiency, use your heat pumps in mild weather when they are most efficient, and use your furnace or boiler in the dead of winter when it is most efficient"

Facts:

- Heat pumps are more efficient in mild weather.
- Heat pumps are always more efficient than furnaces and boilers.



While it's true that heat pumps lose efficiency in very cold weather, they are far more efficient than furnaces and boilers, even at temperatures below zero degrees Fahrenheit.

Myth: "When switching exclusively to heat pumps, you need to leave your boiler on to prevent it from leaking."

Facts:

- You do not need to leave your boiler on.
- Installing new gaskets or draining the boiler will prevent leaking.



4. Heat Pump Myths and Facts - 7

There is some truth to the fact that boilers can leak when turned off, but the solution is not to keep your boiler on. Instead of using the boiler, try replacing the gaskets or draining it if it is not in use.

Myth: "When switching exclusively to heat pumps, you need to leave your boiler on to prevent pipes from freezing."

Facts:

- Keeping a boiler running is inefficient and unnecessary.
- Insulate basement walls or add antifreeze to the distribution system to ensure that pipes don't freeze.



4. Heat Pump Myths and Facts – 8



You do not need to keep the system running to make sure the pipes don't freeze. If you are worried about frozen pipes, you can add insulation to basement walls or even just add antifreeze to the distribution system.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
- 5. Selection**
6. Sizing
7. Placement
8. Installation
9. Operation
10. Other Considerations



That concludes our heat pump myths and facts section. You can find more frequently asked questions about heat pumps on the Efficiency Maine website. As a heat pump installer you can help dispel these myths to ensure customers save the most and get the most out of their systems.

To move to the next section, click the “Next Lesson” button on the lower right hand side of your screen.



In this section, we're going to talk about heat pump selection for indoor and outdoor unit types.

Indoor Unit Types



S. Selection - 1

Let's start with indoor unit types, namely wall units, floor units, ceiling cassettes, and ducted.

On the next slide we're going to talk about some of the advantages and disadvantages of each.

Indoor Unit Types (continued)



Wall Units — Most visible

Most popular, most efficient, and condition the largest area.



Floor Units — Less visible

Less efficient, less capacity, subject to airflow obstruction that limits conditioned area.



Ceiling Cassettes — Nearly invisible

Less efficient, less capacity, limited conditioned area.



Ducted — Nearly invisible

Good for small rooms and super insulated homes if within thermal envelope. Risk of significant heat loss with improper installation, sensitive to open/closed doors unless supply & return in each room, heat all rooms in zone regardless of demand.



S. Selection - 2

Wall units are by far the most popular. They're the most efficient, and can condition the largest area because they have a high volume of air going through them. Because they're mounted high on the wall, they are rarely obstructed by furniture.

The drawback of a wall unit is that **because** they're up high, they tend to be the most visible.

Floor units are much less obtrusive. However, they tend to be less efficient, tend to have less capacity, and their airflow is often impeded by furniture, which reduces the amount of area that they might condition.

Ceiling cassettes are nearly invisible, which is considered a big advantage. They tend to be somewhat less efficient and may have less capacity.

Ducted units are also nearly invisible, and they're really good for small rooms and well-insulated homes if they're ducted within the thermal envelope. On the other hand, ducted units risk significant heat loss if they're improperly insulated. They can be sensitive to open and closed doors, unless the supply and return is in the same room. And they tend to heat all the rooms in the zone regardless of whether there's a need to do so.

Several Single-Zones vs. One Multi-Zone

Several Single-Zones

- More efficient, can throttle down to lower speeds without cycling on/off, which saves energy
- Only heat and cool rooms that need it
- Allow users to have each room in a different mode: for example, AC, dehumidification and fan
- May be eligible for a larger rebate
- Can more effectively dehumidify
- Provide backup in case one unit fails

One Multi-Zone

- Reduces installation cost
- Reduces cleaning cost
- Requires fewer outdoor units compared to multiple single-zones

NOTE: Using one multi-zone heat pump to condition multiple floors can create comfort issues.



S. Selection - 3

Another point to address is single-zone vs. multi-zone systems.

Single-zone heat pumps, which are by far the most popular, tend to be more efficient. They can throttle down to lower speeds without cycling on and off, which can save energy in the shoulder seasons.

They only heat and cool rooms that need it .

Single-zone units also allow users to have each room in a different mode: for example, AC, dehumidify and fan.

And depending on the efficiency of the unit, single zones may be eligible for a larger rebate from Efficiency Maine.

They can more effectively dehumidify.

Another advantage of single zones is that by having multiple single zones instead of a single multi-zone, you have a backup -- if one were to break, the other zones would still be operable.

Because multi-zone outdoor units connect to more than one indoor unit, they can be less expensive to install, easier to clean, and require fewer outdoor units than buying

several single-zone heat pumps.

The disadvantage of a multi-zone system is they tend to deliver heat to all the connected indoor units at once as long as one of them is calling for heat -- even if the others are not calling for heat. One tip to minimize this issue is to avoid having one outdoor unit serving more than one floor.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
- 6. Sizing**
7. Placement
8. Installation
9. Operation
10. Other Considerations



This concludes the section on “selection.” Next, we’ll talk about sizing. Please click on the “Next Lesson” button to move forward.



Now, let's discuss sizing.

Oversized Is Not Better

1. Oversized units can cost more money to operate because of additional cycling
2. Oversized units may “supercool” during AC which can make rooms feel “clammy”
3. Larger units typically have lower rated efficiencies and may have higher operating costs



6. Sizing - 1

The first point is that bigger is not always better.

Oversized units can cost more to buy and, because they're likely to cycle more, they can cost more to operate. As we saw in the earlier graphs, cycling can waste a lot of energy.

Oversized units may also “super cool” in air conditioning mode, which can make the room feel clammy. The reason for this is that the unit may adjust the temperature without removing all the humidity.

Lastly, larger units tend to have lower-rated efficiencies, which means they may have higher operating costs.

Small Units Can Have Big Capacities

- Match max capacity (not rated capacity) at design temp to heating load at design temp
- Use heating load of zone, not entire house (Design load for a typical home is approximately 40,000 btu/h at 0°F)



6. Sizing - 2

Another general sizing principle is that small units can have big capacities at low temperatures. Even if they have overall lower capacity, small heat pumps tend to perform well at low temperatures, which is an important feature in our climate.

So, we recommend matching the maximum capacity at design temperature to the heating load at design temperature, rather than the rated capacity.

And you'll want to use the heating load of the zone that the heat pump is heating, not necessarily the entire house.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
- 7. Placement**
8. Installation
9. Operation
10. Other Considerations



That concludes our section on sizing. To move on to the placement section, please click the “Next Lesson” button on the lower right.



7. Placement

We are now going to discuss placement of the indoor unit and outdoor unit, as well as placement of the line-set and condensate line. Let's begin with indoor unit placement.

Indoor Unit Placement



- Maximize space that can be heated/cooled—big, open spaces
- Locate in frequently used spaces to save the most energy and money
- Consider locating indoor units where they will be accessible for cleaning
- Consider impact of staircases—heat rises, cool falls



7. Placement - 1

Here are some of the criteria to consider:

First, try to maximize the space that can be heated or cooled. You're looking for big, open spaces. That will increase the cost-effectiveness of the heat pump installation because more of the heat provided by the whole-house system will be offset.

Likewise, putting the heat pump in the most frequently used room can help homeowners save the most energy and money.

However you want to be careful about the indoor unit's interaction with existing thermostats. We'll talk about that more in a moment.

You might want to consider locating your indoor units where they'll be accessible for easier cleaning; for instance, not high on a cathedral ceiling.

Also consider the impact of staircases. It's very difficult for heat to go past a staircase that goes up. And it's difficult for air conditioning to bypass a stairwell that goes down.

Indoor Unit Placement (continued)

- Tough to move air through doorways and down dead-end hallways
- Consider all options
 - Wall units
 - Floor units
 - Ceiling cassettes
 - Ducted units
- Pick spots easy to wire/plumb
 - Backing up to closet, unfinished stairwells, garages, basements, crawlspaces, attics, and outside walls
 - Avoid condensate pumps in bedrooms (noise reasons)



7. Placement - 2

Continuing on indoor unit placement, it's tough to move air through doorways and can be very difficult to move air down a dead-end hallway. Every house is different so these are just general rules of thumb.

One approach to consider when evaluating the location of the indoor unit is to first look for a location where a wall unit could be mounted.

If there aren't any good opportunities -- for example a room with many windows -- then you might look for a place where a floor unit might be installed.

If you can't find a space for either a wall unit or a floor unit, you might then consider a ceiling cassette or a ducted unit.

By going in this order, you will have the advantage of trying to get the most efficient indoor unit first, before exploring other indoor unit options.

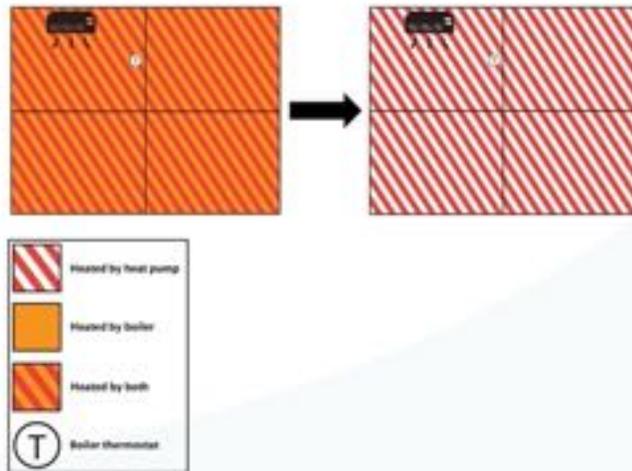
Picking spots that are easy to wire and plumb also makes sense. It's easiest to run line-set through spaces like a closet, unfinished stairwell, or garage. You may find your customers are happiest if you avoid putting condensate pumps in bedrooms, because they can make noise during the air conditioning season.

Thermostat Placement: Heat Pump/Boiler Zone Overlap

The Ideal Case

If heat pump can heat the entire boiler zone

1. Set heat pump for comfort
2. Set boiler lower to use only as backup



7. Placement - 3

Now let's address heat pump placement in relation to existing thermostats for the whole-house heating system.

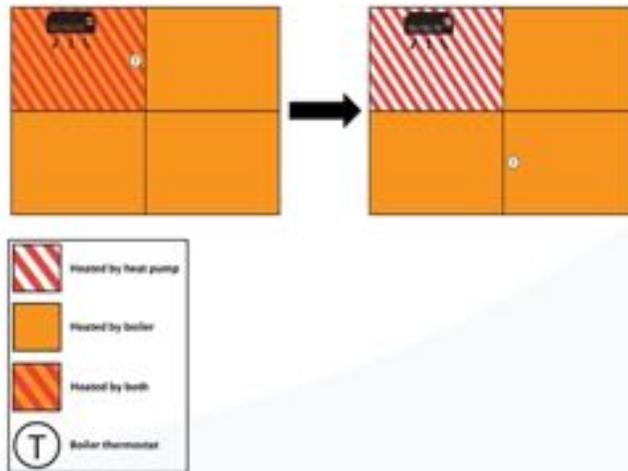
If a heat pump zone and the boiler zone overlap completely, meaning the heat pump can heat the **entire zone** that the boiler heats, then you're in great shape. The homeowner will just need to set the heat pump for comfort, and set the boiler down so that it will only come on if the heat pump can't meet the heating demand.

Heat Pump/Boiler Overlap:

A More Challenging Case

If heat pump reaches boiler thermostat, but can't heat entire boiler zone, create "2 zones" by

1. Moving boiler thermostat out of heat pump range and
2. Closing radiators/vents within heat pump range.



7. Placement - 4

This next slide talks about a more challenging installation.

If the heat pump zone includes the boiler thermostat, but it can't heat the entire boiler zone, that may create competition between the central boiler and the heat pump. To maximize the savings and effectiveness of the heat pump, we recommend trying to create two separate zones.

First, move the boiler thermostat out of the heat pump zone. Then, in the area where the heat pump can reach, try to disable or minimize heat from the central boiler or furnace.

This might mean closing dampers on the radiator or closing furnace ducts. This lets the heat pump heat one zone and the boiler or furnace heat the other, so there's no conflict.

Line Set Placement



Minimize line set length, while also respecting manufacturer minimum lengths.



7. Placement - 5

Now let's move from siting the indoor unit to line-set placement.

First of all, from an aesthetics, heat loss, and installation cost point of view, it makes sense to minimize line-set lengths. If the manufacturer has minimum lengths you'll want to honor those.

Line Set Placement

Minimize visible indoor line set (use drop ceilings, closets, attics, basements, crawlspaces, garages, etc.)



7. Placement - 6

It's ideal to minimize the visible indoor line-set as much as possible. You may be able to use drop ceilings or take advantage of closets, attics, basements, stairwells, crawlspaces, or garages. This will make for a less obtrusive and more visually pleasing installation. While this won't impact efficiency, it may help you get more referrals.

Line Set Placement

Protect from damage (lawn mowers, falling ice, wood piles, etc.)



7. Placement - 7

Another consideration for line-set placement is protection of the outdoor unit.

The picture on the left shows an unprotected line-set that could be hit with snow coming off the roof, bumped by a passing lawn mower, or other hazards. The unit shown on the right is a protected line-set -- with a roof and a cover.

There are a couple other unrelated problems in the picture. On the left you can see the one unit is blowing its exhaust into the other's intake, which is not ideal. You can also see that it's mounted on the ground which may work fine for air conditioning but will not work as well when snow accumulates on the ground.

Line Set Placement

Keep them vertical or horizontal (not diagonal)



7. Placement - 8

A good practice for line-set placement is to keep line-sets vertical or horizontal, not diagonal.

Line Set Placement

Consolidate lines into single line cover if possible



7. Placement - 9

On the left we have three line-set covers next to each other, rather than just one containing all three line-sets.

On the right hand side you can see multiple line-sets going through one line-set cover, which is more aesthetically pleasing for the customer.

Line Set Placement

Stay near gutters, trim, and other wires — avoid cluttering open spaces



7. Placement - 10

Another best practice that we've observed is keeping the line-set near gutters, trim or other existing wires, to avoid cluttering up open spaces.

In this case, on the left, you see two line-sets a few inches away from each other and a third a couple feet away; and they're white on red siding. In the right photo, the line-set is right next to a gutter of the same color, blending into the side of the house.

Line Set Placement

Avoid visible sides of house



7. Placement - 11

Another good practice is to try to avoid installation on visible sides of the house.

Here on the left you can see a home needing a heat pump on the far end of the house. Instead of putting the heat pump on the end, it was placed on the front of the house. In fact, there are three on the front of the house, which is covered with line-sets and outdoor units.

On the right, the outdoor unit is tucked onto a foundation underneath a deck and the result is an unobtrusive installation.

Outdoor Unit Placement

★ Mount greater than or equal to 18" above ground unless protected from the snow



BAD



GOOD



★ Efficiency Maine Installation Requirements Checklist

7. Placement - 12

Now we'll discuss outdoor unit placement. The red star on the slide means that this is a requirement on our Installation Requirements checklist.

To be eligible for rebates, units must be mounted at least 18 inches above the nearest surface below it -- whether that's a deck or the ground -- unless they are protected from snow. On the left you can see two problems. The first is that one of the units is blowing into the other. Second, they're on the ground so these units, while they may work in the summer, will need to be shoveled out in the winter.

In the right photo, you can see that the unit is up off the ground clear from snow.

Outdoor Unit Placement

Unobstructed airflow — avoid shrubs, risk of snow drifts, and structures that may block airflow



7. Placement - 13

Unobstructed airflow is critical. Placement locations should avoid shrubs, risks of snow drifts or any structures that may block airflow.

Customers may be tempted to obscure units for aesthetic reasons, but the placement must have access to unobstructed air flow. On the left is an example of two units obstructing each other.

Outdoor Unit Placement

- ★ Does not interfere with walkway, porch, window or door



★ Efficiency Maine Installation Requirements Checklist

7. Placement - 14

Another installation requirement is the outdoor unit must not interfere with a walkway, porch, window, or door. Placement should also consider how to prevent icy patches on walkways.

These two installations probably could have been done differently. The one on the left creates an ice hazard for the door right next to it. On the right, you can see that the outdoor unit partially blocks the stairs to the house.

Outdoor Unit Placement

Avoid placing the outdoor units near dryer vents — lint has the potential to clog the coils



7. Placement - 15

Avoid placing outdoor units near dryer vents. Sometimes the lint that comes out of a dryer vent can collect on a heat pump, causing it to clog prematurely and require cleaning.

Outdoor Unit Placement

Make it serviceable. Make it easy for the service tech — it might be you.



7. Placement - 16

When choosing the outdoor location, consider serviceability. The one on the left, installed between stories, will be difficult to service. The one on the right is at a convenient, serviceable height.

Outdoor Unit Placement

Mounting at the base of a wall or corner, rather than the middle, will minimize noise



7. Placement - 17

Lastly, consider the noise impact of the outdoor unit when choosing a location. You can reduce the noise the unit will generate by installing it at the base of the wall or at the corner of the house rather than the middle of the wall.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
7. Placement
- 8. Installation**
9. Operation
10. Other Considerations



That concludes the placement section. Please click the “Next Lesson” button on the lower right hand side of the screen to move on to the installation section.



Now, let's talk about installation.

Indoor Unit Installation

- ★ Ensure level (to drain condensate)



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 1

The first step in indoor unit installation is to make sure the unit is level so the condensate drains properly. This is a requirement for rebates.

Indoor Unit Installation

Observe service clearances



8. Installation - 2

The next step is to make sure to observe all service clearances.

Outdoor Unit Installation

★ Unit must be level and plumb



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 3

On the exterior, we also need to make sure that the outdoor unit is level and plumb. This is also an installation requirement.

Outdoor Unit Installation

- ★ Outdoor unit and line set protected from roof runoff by gutter, rain cap, gable end, or overhang.



BAD



GOOD



GOOD — If Under a Metal Roof



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 4

Installers must also ensure the outdoor unit and line-sets are protected from roof runoff by a gutter, rain cap, gable end, or overhang.

On the left you can see the outdoor unit is installed beneath a roof valley of a house where a significant amount of ice and snow have come down on both the outdoor unit and line-set. Snow and ice can wreak havoc on the line-set between the outdoor unit and the house.

The middle photograph shows a better installation. You see a rain cap is protecting the outdoor unit from rain and it's close to the house to protect the unit from falling ice.

In the right hand photo, the installer has put a custom roof over the outdoor unit. This is critical under a metal roof where a lot of snow and ice can fall at once. Proper protection is a requirement of our Checklist.

Outdoor Unit Installation

If ground mounted, there must be a stable base. ★ Outdoor unit secured to wall or stand.



BAD



GOOD



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 5

If the unit is ground mounted, it needs to be on a stable base. As seen here, a concrete pad is a better option than a stand directly on the ground. The outdoor unit also must be secured to the wall or stand. This is a requirement of our Checklist.

Outdoor Unit Mounting Options

- **Good:** Wall mounts keep units away from rakes and mowers, but can transmit noises inside.
- **Better:** Ground stands minimize noise, but can be susceptible to frost heaves if installed with inadequate drainage. Consider adjustable legs.
- **Best:** Foundation brackets minimize noise and stay out of the way of rakes and lawn mowers.



S. Selection - 6

Now, let's talk about all outdoor unit mounting options.

There are three general approaches.

Wall mounts are effective because they keep the units up off the ground, away from rakes and mowers. However, as we discussed before, if the wall mount is attached to the wooden framing of the house it can transmit noise inside. A better option is a ground stand, which can minimize noise. However, there are drawbacks to a ground stand. Depending on how they're installed, they may be susceptible to frost heaves.

One thing to consider if you've put in a ground stand is a ground stand with adjustable legs. In the spring, if you see that the unit has shifted due to frost heaves, you can adjust the stand and get the unit level again.

The best bracket is what we've shown here, a foundation bracket, which bolts onto the foundation of the house. It gets the unit off the ground and avoids noise transmission.

Outdoor Unit Mounting

To reduce noise risk, consider rubber isolation gaskets between the outdoor unit and the brackets, and between the brackets and the house.



8. Installation - 7

Another way to reduce the risk of noise is to use rubber isolation gaskets between the outdoor units and the brackets, and between the brackets and the house, as seen here.

Line Set Installation Requirements

★ Requirements

- Length and refrigerant quantity per manufacturer's guidelines
- Purged with nitrogen, pressure tested and evacuated per manufacturer's instructions. If the manufacturer does not offer instructions, the Efficiency Maine procedure should be followed. (See next slide.)
- Flare connections tightened using manufacturer's torque specification

★ Efficiency Maine Installation Requirements Checklist

Recommendations

- Use bending tool if necessary to avoid kinks when bending.
- Crimp, tape, or cap loose ends of line set to keep clean until final connection.



8. Installation - 8

Moving on to line-set installation, as you know, line-set installation requirements vary depending on manufacturer.

In order to be eligible for a rebate, line-sets must be purged with nitrogen, pressure tested, and evacuated according to either the manufacturer's instructions. If the manufacturer does not offer instructions, the Efficiency Maine procedure should be followed.

In addition to these requirements, Efficiency Maine has compiled recommendations, listed here, based on conversations with manufacturers, distributors and installers.

Line Set Installation Best Practices: Triple Evacuation Procedure

SEQUENCE	ACTION	PRESSURE	DURATION
1	Flush with nitrogen to blast out any debris and to dry lines		
2	Pressurize with nitrogen	500-600 PSIG	20-60 min with no drop on pressure gauge
3	Evacuate system	4,000 microns of mercury	15 minutes
4	Break vacuum with nitrogen	2-3 PSIG	
5	Evacuate system	1,500 microns of mercury	20 minutes
6	Break vacuum with nitrogen	2-3 PSIG	
7	Evacuate system	500 microns of mercury	60 minutes



8. Installation - 9

Continuing with line-set installation best practices, we encourage all installers to follow the triple evacuation procedure to ensure proper functioning of the system.

Torque Chart

Remember to always follow your manufacturer's torque requirements.

Mitsubishi		
Pipe Diameter	Tightening Torque	
	Ft-lb	N-m
1/4 "	10 to 13	13.7 to 17.7
3/8 "	25 to 30	34.3 to 41.2

Daikin		
Pipe Diameter	Tightening Torque	
	Ft-lb	N-m
1/4 "	10.4 to 12.7	14.2 to 17.2
3/8 "	24.1 to 29.4	32.7 to 39.9

Fujitsu		
Pipe Diameter	Tightening Torque	
	Ft-lb	N-m
1/4	11.8 to 13.28	16 to 18
3/8	23.6 to 30.9	32 to 42



8. Installation - 10

Please follow manufacturer guidelines regarding the tightening of flare connections. We've included the torque charts from major manufacturers here.

Line Set Installation

- ★ Visible line sets run through line-set covers with transition and termination fittings (Exception: unfinished spaces and space between house and outdoor unit)



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 11

Another Efficiency Maine requirement is that visible line sets be inside of line-set covers with transition and termination fittings. The only exception to this requirement is if the line set is running through unfinished spaces and/or the space between the house and the outdoor unit.

On the left, you can see that there are no termination fittings. The termination fittings, which you see on the right, secure the cover to the house. These fittings look good aesthetically and provide structural support to the cover. Line-set covers themselves are not structurally strong.

Line Set Installation

Insulation covers full length of line sets (no exposed copper)



8. Installation - 12

Another best practice is that insulation covers the full length of the line sets and there should be no exposed copper. In the left photo you can see the installer cut the insulation back to make it easier to install the line-set, and created a point of energy loss. In the right-hand photo you can see the installer did an excellent job of restoring the insulation cover and covering all the copper.

Line Set Installation

★ Floor/wall/ceiling penetrations sealed



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 13

Another rebate requirement is to seal all floor, wall, and ceiling penetrations. You can see in the left photo there is an opportunity for water, snow, varmints, and insects to come in next to that line-set.

In the right-hand photo, the penetration is well sealed.

Line Set Installation

The full length of the line set should be supported. ★ Line set is either not coiled (preferred) or is coiled horizontally.



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 14

Another best practice we've talked about is protecting a line-set from falling ice if it's below a metal roof. Installers should be certain that the line set is always supported. The right-hand picture shows a line-set cover that's properly fastened to the house. In the left-hand photo, it's draped and only supported by zip ties. And you'll also notice that the line set in the picture on the left is coiled vertically. If a line set has to be coiled, it should be horizontal. This is a requirement of our Checklist.

Line Set Placement

Match color of house



7. Placement - 15

When possible, try to match the color of the line-set cover to the house. In the picture on the right, the line-set cover blends better than the picture on the left.

Condensate Line Installation

- ★ Install condensate line without dips or traps.
Use rigid pipe (not flexible tubing) for long, low-slope runs.



★ Efficiency Maine Installation Requirements Checklist

8. Installation - 16

Remember to install condensate lines without dips or traps. This avoids having condensate back up into the indoor unit. Indeed, with even a small dip, water can back up multiple feet in the line. This is a requirement of our Checklist.

In fact, when possible, use rigid pipe.

In the photo on the left, you see a dip. In the photo on the right, you see a rigid pipe.

Electrical Connections Installation

Electrical work performed by licensed electrician or as authorized by Electrician's Board.



8. Installation - 17

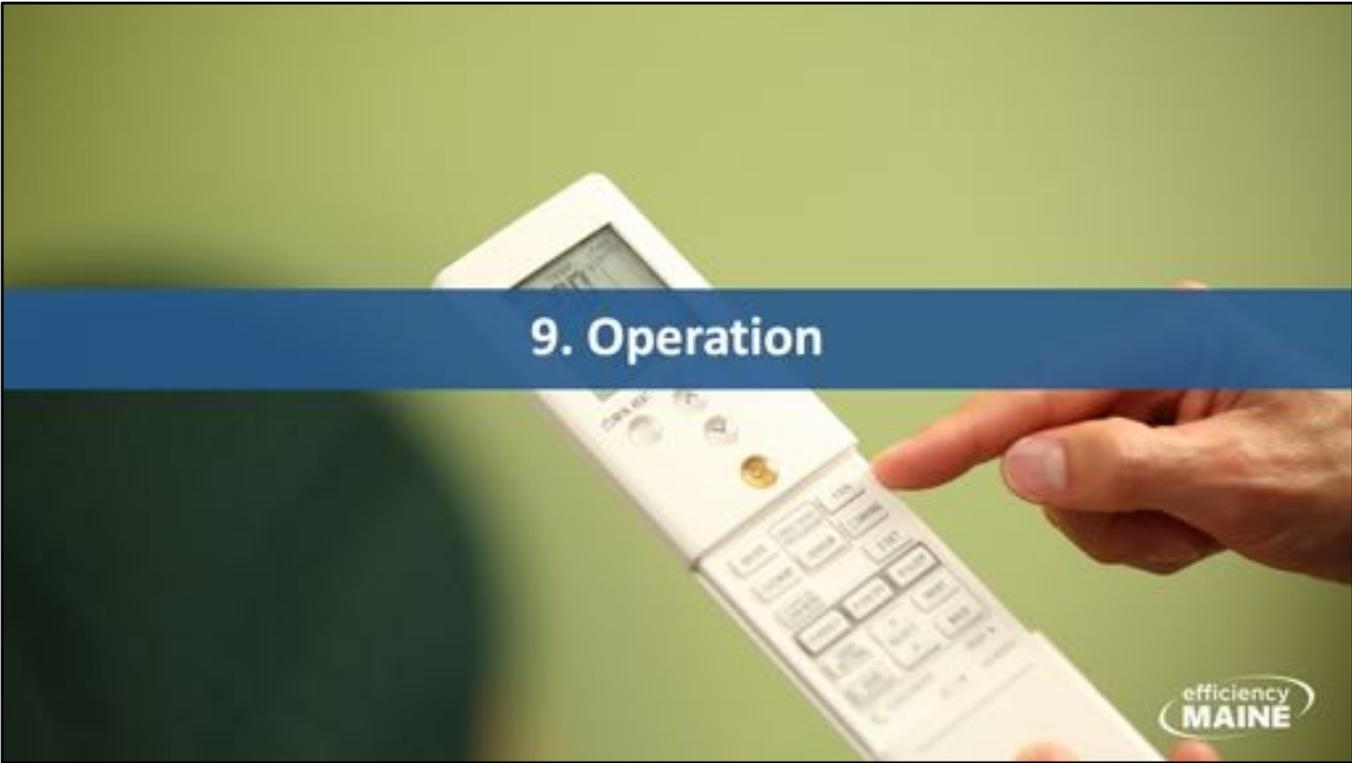
Lastly let's cover the installation of the electrical connection. Make sure the disconnect box's wiring is secured with a lock, strap tie, or a box that provides some means of protection. This work must be done by a licensed electrician.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
7. Placement
8. Installation
- 9. Operation**
10. Other Considerations



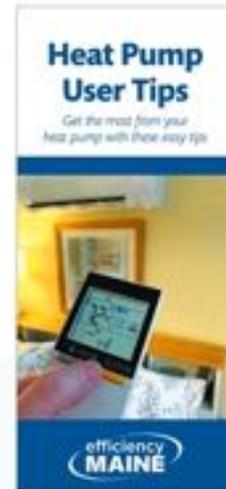
This concludes the section on Installation. Click the “Next Lesson” button to move on to heat pump operation.



Let's review heat pump operation.

Customer Training

- ★ Give owner's manual to customer.
- ★ Provide customer with Efficiency Maine Heat Pump User Tips.
- ★ Ensure customer understands electric bill may increase, but overall energy use in the winter may decrease if heat pump used optimally.



★ Efficiency Maine Installation Requirements Checklist

9. Operation - 1

Next, we're going to talk about heat pump operation.

While you know how to operate a heat pump, your customers may not. We see that some customers don't get the most out of their heat pump because they don't know how to use it as well as they could. We send customers tips electronically and in the mail to help them, but we also require that installers go through heat pump tips as part of our Checklist. After reviewing the tips with customers, you can also direct them to the Efficiency Maine website for additional educational resources.

We'll review some of those tips now and why we include them. **Reviewing these best practices can limit call backs and customer dissatisfaction.** And as we discussed earlier, using the heat pump correctly can help customers save energy and increase savings.

Customer Training (continued)

Installers should ensure customers can:

- ★ Power on and off
- ★ Clean filter
- ★ Switch between heating and cooling modes
- ★ Change the temperature setpoint
- ★ Adjust airflow direction
- ★ Call for service



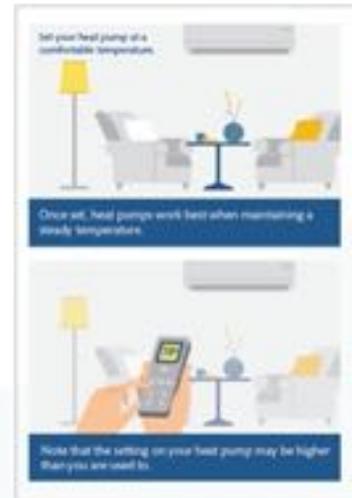
★ Efficiency Maine Installation Requirements Checklist

9. Operation - 2

Some of the basics that we ask you to cover as part of the installation are how to power on and off the unit, how to rinse the filter, how to switch between heating and cooling modes, how to change the temperature set point, how to adjust the airflow direction, and how to call for service. These tips are intended to help customers get the most from their heat pumps.

User Tip: "Set it and forget it"

- Heat pumps work best when maintaining a steady temperature
- "Set it and forget it"



You'll remember from earlier in the presentation that turning down the heat pump at night to save energy was one of the common myths we see. Encouraging homeowners to set it and forget it will help them get the most from their system and ensure that the system operates most efficiently.

Outdoor Unit — The Basics



- Keep clear of obstructions, like shrubs, leaves or snow
- Professionally inspected annually, clean as necessary (especially at beginning of heating season)
- Don't worry about frost (will self-defrost)



9. Operation - 4

Another important tip to share with customers is the need to keep the outdoor unit clear from obstructions. We recommend that outdoor units for heat pumps, in general, be professionally inspected every year and cleaned as necessary.

We've heard from installers that the best time to clean a unit would be at the end of the air conditioning season when the unit has been blowing more dust than you would typically see in the snowy winter.

In addition, you may want to let your customers know that, besides keeping the outdoor unit unobstructed and protected from falling ice and snow from the roof, heat pumps can take care of themselves in the winter. It can be a bit alarming to see an outdoor unit frost up, so you may want to share with your customers that they don't need to worry about it.

Use Your Heat Pump Year-Round



- High-performance heat pumps are the most efficient heating system.
- If you have both a heat pump and a furnace/boiler, a heat pump is the more energy-efficient choice.



9. Operation - 5

As we discussed above in the myths and facts, section, it's important to reiterate that heat pumps work year round.

High-performance heat pumps are the most efficient heating system, even on the coldest winter day. If you have both a heat pump and a furnace/boiler, your heat pump is the more energy-efficient choice.

User Tips: Temperature and Thermostat

- **Set the Thermostat for Comfort**
 - Set for the temperature that makes the house comfortable
 - This may be higher than the customer is used to
- **Prioritize Your Heat Pump**
 - Set the heat pump temperature higher than the furnace to ensure the heat pump, and not the furnace, is providing heat



9. Operation - 6

The next user tip is about temperature and thermostat use.

We recommend that customers set their thermostat for their comfort. This temperature may be higher than what they are used to with their boiler or furnace. For instance, someone who may set their furnace to 68 degrees Fahrenheit may find that this is similar to setting their heat pump to 70 degrees.

At Efficiency Maine, we encourage customers not to worry about the number, just set it for comfort.

And as we discussed in the siting section, we also recommend that to get maximum savings customers should prioritize their heat pump. Meaning use the heat pump whenever you can and only use the furnace or boiler as needed. Setting the heat pump temperature higher than the whole-house system will help.

Give the heat pump its own zone



- Step 1 -- To prevent the boiler/furnace from competing with the heat pump, close dampers/radiators in spaces heated by the heat pump.
- Step 2 -- To prevent the heat pump from interfering with the boiler/furnace thermostat, move the thermostat out of range of the heat pump.



9. Operation - 7

Another tip is to give the heat pump its own zone. You may have already walked the homeowner through the relationship between the heat pump and the thermostat for the central system. If not, talk with the homeowner about how they may interact. Here's how we talk about it in the heat pump tips:

Step 1 -- To prevent the boiler/furnace from competing with the heat pump, close dampers/radiators in spaces heated by the heat pump.

Step 2 -- To prevent the heat pump from interfering with the boiler/furnace thermostat, move the thermostat out of range of the heat pump.

User Tip: Avoid Temperature Auto Mode

- “Auto Temperature” mode automatically switches between heating and cooling based on indoor temperature.
- System could start heating on a cool summer night or cooling on a sunny winter afternoon.
- Set the heat pump mode to “Heat” in the winter and “Cool” in the summer.

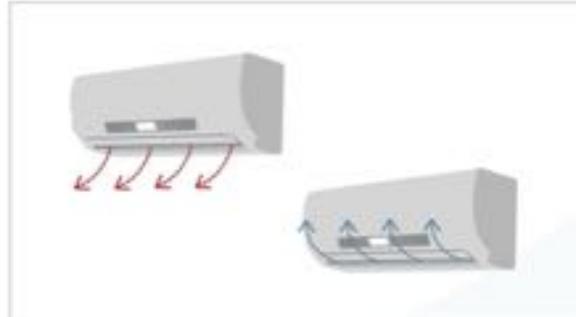


9. Operation - 8

We suggest avoiding the “Temperature auto-mode,” which may not be intuitive to a new heat pump user. This is an important tip to share with homeowners because a system put in auto mode may accidentally switch to heat mode in the middle of a cool summer night, or to AC mode on a sunny winter afternoon.

User Tip: Optimize the Fan Setting and Air Flow Direction

- Fan setting
 - Start with “Auto Fan”
 - If uncomfortable, set a custom speed
- Air Flow Direction
 - Direct warm air towards the floor and away from room occupants
 - Direct cool air up or directly at occupants



9. Operation - 9

On the other hand, your customers may want to start off with “Auto Fan” and see if that works for their space.

If that doesn't spread the heat far enough, they can adjust the fan's speed up or down according to their needs. We have also found that helping customers with air flow direction can ensure heat pump satisfaction.

Aiming warm air directly at an occupant can actually make them feel chilled, so generally we would direct warm air away from occupants and cool air at occupants.

Next Section

1. Introduction
2. Rebates and Loans
3. Becoming a Residential Registered Vendor or Commercial Qualified Partner
4. Heat Pump Myths and Facts
5. Selection
6. Sizing
7. Placement
8. Installation
9. Operation
- 10. Other Considerations**



Reviewing these tips and other aspects of operation can help ensure customer satisfaction and savings.

Now that we have gone over operation tips, we can finish up with a few other considerations. Please click the “Next Lesson” button to move to the final section.



In this final section, we'll briefly address some other considerations.

Minimizing Issues with Abandoned Boilers/Zones

- Boilers that leak when turned off
 - Consider gaskets
 - Consider draining
- Frozen pipes
 - Insulate between pipes and outdoors (don't leave pipes outside the insulation)
 - Consider antifreeze in distribution system



10. Other Considerations - 1

If your customer is switching entirely away from a boiler, they may find the boiler starts to leak once it's turned off.

There are two ways you can avoid this problem. First, consider installing rubber gaskets on the boiler. That may prevent leaking when it cools. Another option is to drain the boiler and distribution system if they are not going to be used.

Another consideration is how to prevent frozen pipes. Some boilers unintentionally heat the basement, keeping pipes above freezing. If the boiler is shut off, the pipes won't be heated and can freeze.

One solution for this is to consider insulating the basement walls between the pipe and the outdoors. But be mindful of where the pipes are in relation to the insulated basement walls -- don't leave the pipes on the outside of the insulation, which might make them more likely to freeze. Another option is to consider adding some antifreeze into the distribution system.

Insulating Ductwork and Sealing

- ★ All ductwork must be insulated to R8 and sealed.



★ Efficiency Maine Installation Requirements Checklist

10. Other Considerations - 2

In order for ducted heat pumps to qualify for rebates, the ductwork needs to be sealed to avoid air leakage and insulated to minimize heat loss. The ducts should be sealed using duct mastic or UL-181-rated tape, and must be insulated to at least R8.



Thank you for your attention during this training and thanks for your good work helping people in Maine save energy everyday.

If we can be of help, please give us a call at (866) 376-2463 or visit our website, efficiencymaine.com.