Heat Pump Planner

Clean Heating, Cooling, and Water Heating Options for Homes
# Heat Pump Planner

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NYSERDA offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean energy jobs. A public benefit corporation, NYSERDA has been advancing innovative energy solutions since 1975.
What Are Heat Pumps?

Heat pumps are a cleaner, proven technology that can help save on energy bills and provide up to 100 percent of your home’s heating and cooling needs, depending on the system type. In the summer, they work like an air conditioner to move heat outdoors, cooling your home, more efficiently than central air conditioners or window units. In the winter, the process is reversed by using electricity to move heat into your home instead of burning fuel. These systems work all winter and can reduce your energy costs, decrease your carbon footprint, and increase comfort every day.

Types of Heat Pumps for Heating and Cooling

**Ground source or Geothermal** heat pumps use buried pipes to extract heating or cooling from below ground.

Compared to air source heat pumps, ground source heat pumps are more efficient and do not require outdoor units (condensers).

Ground source systems typically take longer and cost more to install.

**Air source** heat pumps extract heating or cooling from outdoor air. Technology designed for cold climates can efficiently heat homes all winter across New York State.

Air source systems are less costly to install and more versatile, but not as efficient as ground source heat pumps.

Outdoor units – similar to AC condensers – are necessary with air source heat pumps.

Learn more at: nyserda.ny.gov/HeatPumpPlanner
Why Heat Pumps?

Heat pumps are **safer** and more **efficient**, **sustainable**, and **versatile**. Why?

- Heat pumps cost less to operate than oil, propane, or electric baseboard heating systems.
- Heat pumps are a safer option compared to gas or liquid fuels. There is no chimney, gas line, oil tank, or burning of fuels and no risk of generating carbon monoxide.
- Heat pumps can accommodate all of your heating and cooling needs, depending on the type of heat pump. Most forced-air systems use the same unit to deliver cool air to your house in the summer and provide heat in the winter. However, heat pumps with hydronic baseboards, panels, and radiant floors need to be paired with a fan coil to accommodate cooling needs.
- Heat pumps generate no greenhouse gas emissions when your electricity comes from clean sources. Heat pumps can also be powered by solar at your home.
- With current technology, heat pumps are efficient in all seasons and can provide most (if not ALL) of the heating needs in homes across New York State.

Using the Heat Pump Planner

What kind of home do you have? The guide shows a variety of systems in several types of homes.

Do you have forced-air heating? If your home currently has ducts for heating or cooling, these can often be reused for ducted heat pump systems.

No ducts? No problem. There are many ductless options for heat pumps.

Whole home solution? Heat pumps can efficiently heat and cool entire homes all across the State, but they can also be installed in additions or spaces with comfort problems.

Interested in water heating strategies? Depending on the system and home type, heat pumps can also be used for heating water for bathing, washing, and cooking.

Know the right questions to ask. Each system includes key questions for your heat pump installer. Work with installers to review options for your home type, price point, and other goals.


Understand costs, financing, and incentives. Heat pumps are less costly than oil, propane, or electric baseboards. Check with NYSERDA or your electric company for incentives and financing options.

Consider Heat Pumps for Heating and Cooling When:

- You want to save money compared to an oil, propane, or electric baseboard heating system.
- You want to add air conditioning or replace an existing AC unit.
- Your heating system is old and will soon need replacement.
- You are planning a major renovation or building a new home.
- You want to address comfort problems in certain areas of your home.
- You need to provide heating and cooling to an addition.
- You want to improve health and safety for your family.
- You want to reduce your carbon footprint.
Ductless Heat Pump for a One-Story Home

Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Ductless heads** distribute heated or cooled air into a space. They operate very quietly. See next page for options.

**Outdoor units** operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

**Window and door upgrades** can improve comfort and efficiency.

**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

**Thermostats** Some thermostats can operate both heat pumps and other heating systems.

**Refrigerant lines** are small, insulated tubing that connect ductless heads and outdoor units. Coordinate placement and color with your installer.
Ductless Heat Pumps

key considerations

Many options for indoor fan coils or “heads” are available. For optimal comfort and efficiency, each head should be sized to meet specific heating and cooling needs. Your heat pump installer can suggest the best options based on size and configuration of the space.

1. Low-wall or floor mount units may be installed where radiators once were. Do not block them with furniture.

2. High-wall are the most common and versatile.

3. Recessed can be flush with ceilings or walls. Ask your installer about installation and maintenance.

Features

- Among simplest and least expensive heat pump system to install
- Control temperature in different areas of the home
- Quiet and efficient operation
- Eliminate window air conditioners

Types of Ductless Heads

Cost Considerations

Ask Your Installer

- What size units do I need? Ask for room-by-room heating and cooling calculations.
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each head? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options; as larger incentives may be available for eligible customers
- Ductless heat pumps are among the simplest and least expensive to install
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, your gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: nyserda.ny.gov/HeatPumpPlanner

This document is part of NYSERDA’s Heat Pump Planner.
Thermostats

Some thermostats can operate both heat pumps and other heating systems.

Outdoor units operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

Electric service may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

Refrigerant lines are small, insulated tubing that connect air handlers and outdoor units. Coordinate placement and color with your installer.

Outdoor units operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

Thermostats Some thermostats can operate both heat pumps and other heating systems.

Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes
Ducted Heat Pumps

Features

- Heating and cooling distributed throughout the home with new or existing ducts
- No wall-mounted indoor units
- Quiet and efficient operation
- Eliminate window air conditioners

Air Handler Options

Air handler equipment moves warm or cool air through ducts. Your installer can guide you to the best options based on heating and cooling needs, existing systems, and home configuration.

Ask Your Installer

- Will proper heating and cooling get to each space? Ask for room-by-room heating and cooling calculations.
- Are my ducts big enough for a heat pump? What modifications are needed?
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Conventional air handlers distribute air through larger ducts. They are often located in basements, attics, or utility closets. They can be installed to blow air upwards, downwards, or sideways to fit within your home.

Compact ducted air handlers usually serve smaller areas such as one to three rooms. Their slim profile means they often fit in dropped ceilings, but leaving access for maintenance is important.

Cost Considerations

Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- If your home has ducts that can be reused, installation costs will be lower
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs
Multi-Zone Heat Pump for a One-Story Home

Heat pumps use electricity to provide clean, efficient heating and cooling.

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- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

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**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Ducts** distribute warm or cool air to rooms. Existing ducts can often be modified and reused. Ducts work best in insulated spaces. Ask your installer to pay special attention to insulation and duct sealing.

**Thermostats** Some thermostats can operate both heat pumps and other heating systems.

**Ductless heads** distribute heated or cooled air into a space. They operate very quietly.

**Window and door upgrades** can improve comfort and efficiency.

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**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

**Air handlers** distribute warm or cool air through ducts.

**Refrigerant lines** are small, insulated tubing that connect each air handler and/or ductless head to the outdoor unit. Coordinate placement and color with your installer.

**Outdoor units** operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice. **Multi-zone** means multiple air handlers, ductless heads, or a combination connected to a single outdoor unit.

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HEAT PUMP PLANNER

MORE ABOUT MULTI-ZONE HEAT PUMPS >
**Features**
- Save space outdoors with multiple indoor units connected to one outdoor unit
- Control temperature in different areas of the home
- Options for both ducted and ductless heating and cooling
- Quiet and efficient operation
- Eliminate window air conditioners

**Types of Indoor Units**
Multi-zone heat pumps allow you to “mix and match” ducted air handlers and ductless “heads.” Each should be sized to meet specific heating and cooling needs of the space it serves. Your installer can suggest the best options based on those needs, configuration of the home, and location of ducts (if present). Options include:

- **High-wall ductless heads** are among the most common and versatile.
- **Low-wall ductless heads** may be installed where radiators once were. Do not block them with furniture.
- **Ducted air handlers** come in a wide range of configurations. Some serve a single room; others can serve most of a home.

**Ask Your Installer**
- What size units do I need? **Ask for room-by-room heating and cooling calculations.**
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each indoor unit? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating the outdoor unit(s)?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

**Cost Considerations**

**Installation Cost**
- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- Each zone adds cost, so use fewer zones when practical
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

**Operating Cost**
- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

This document is part of NYSERDA’s Heat Pump Planner. Learn more at: nyserda.ny.gov/HeatPumpPlanner
Ground Source Heat Pump for a One-Story Home

Geothermal Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Ground source**, or Geothermal, systems heat and cool homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Ducts** distribute warm or cool air to rooms. Existing ducts can often be modified and reused. Ducts work best in insulated spaces. Ask your installer to pay special attention to insulation and duct sealing.

**Window and door** upgrades can improve comfort and efficiency.

**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

The **heat pump** extracts heat from the ground loop, and a blower moves heated air through the ducts. In the summer, the heat pump operates in reverse and sends cool air to the home.

**Ground Loop** Underground pipes exchange heat with the ground. See next page for options.
Ground Source Heat Pumps

**Features**
- Highest efficiency with lowest operating costs
- Quiet with no outdoor condensers or window air conditioners
- Heating and cooling distributed throughout the home with new or existing ducts
- Can also provide water heating

**Ground Loop Types**
Underground pipes exchange heat between the heat pump and the ground. Your installer will determine the proper type and size of ground loop based on:
- Land area available
- Type of rock or soil
- Heating and cooling needs of the home

There are two main types of loops.

*Vertical wells* are hundreds of feet deep.

*Horizontal fields* have coils placed in a much more shallow but larger area.

**Ask Your Installer**
- Will proper heating and cooling get to each space? *Ask for room-by-room heating and cooling calculations.*
- Are my ducts big enough for a heat pump? What modifications are needed?
- How long will installation take? Where and when will you need access?
- Who is responsible for landscaping after the ground loop is installed?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

**Cost Considerations**

**Installation Cost**
- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- While ground source heat pumps are the most efficient, they are also more expensive to install
- Cost varies with region, installation complexity, installer experience, system size, and manufacturer

**Operating Cost**
- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: [nyserda.ny.gov/HeatPumpPlanner](http://nyserda.ny.gov/HeatPumpPlanner)
Ground Source, Hydronic Heat Pump for a One-Story Home

Geothermal heat pumps use electricity to provide clean, efficient heating and cooling.

- **Ground source**, or Geothermal, systems provide comfort all winter across New York State
- **Hydronic systems** send warm water to heating devices throughout the home
- **Healthy and safe** with no fuels or carbon monoxide risks
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with low greenhouse gas emissions
- **Versatile** solution for new or existing homes

![Diagram of ground source heat pump system]

- **Baseboard or panel heaters** come in many shapes and sizes to heat different rooms.
- **Fan coils** can provide cooling and additional heating. They can serve individual rooms or be ducted to several rooms.
- **Radiant floors** heat rooms using warm water in pipes beneath the floor.
- **Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.
- **Window and door upgrades** can improve comfort and efficiency.

- **Pipes** carry warm water to heating devices throughout the home. Copper, iron, and certain plastics are viable pipe materials.
- **Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.
- **The heat pump** extracts heat from the ground loop to make warm water. In the summer, it operates in reverse to provide cooling.
- **Ground Loop** Underground pipes exchange heat with the ground.

**FROM REST OF HOUSE TO REST OF HOUSE**

Pipes carry warm water to heating devices throughout the home. Copper, iron, and certain plastics are viable pipe materials. The heat pump extracts heat from the ground loop to make warm water. In the summer, it operates in reverse to provide cooling. Window and door upgrades can improve comfort and efficiency. Insulation and air sealing are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.
Ground Source, Hydronic Heat Pumps

Features
- Quiet with no outdoor condensers
- Can also provide hot water for bathing, washing, cooking, etc.
- Comfort from warm water heat throughout the home
- Air ducts are not necessary

Heat Delivery Options
Heat pumps provide warm water rather than hot water, and conventional baseboards and radiators are often not sufficient. Heating devices designed for warm water are needed to provide comfort. Your installer can suggest the best heat delivery options based on your heating needs.

Ask Your Installer
- Will proper heating and cooling get to each space? Ask for room-by-room heating and cooling calculations.
- Do I need to upgrade radiators or baseboards?
- Will the system use “outdoor reset” control to optimize efficiency and comfort?
- How long will installation take? Where and when will you need access?
- Who is responsible for landscaping after the ground loop is installed?
- How do I operate my system for optimal comfort and efficiency?
- What annual maintenance is required?
- What is the expected lifespan and warranty?

Cost Considerations
Installation Cost
- Check with NYSERDA, your electric company, and installer for incentives and financing options. Larger incentives may be available for eligible customers.
- Ground source heat pumps may have a high upfront cost but will operate efficiently over a long lifetime.
- Cost varies with region, installer experience, heat delivery options, system size and manufacturer.

Operating Cost
- Your overall heating costs will likely decrease if switching from oil, propane or electric baseboard.
- If you previously heated with fuel, don’t be surprised to see electric bills rise. Your gas, oil, or propane bills will drop or disappear.
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs.

Learn more at: nysesa.ny.gov/HeatPumpPlanner
This document is part of NYSERDA’s Heat Pump Planner.
Ductless Heat Pumps for a Two-Story Home

Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Ductless heads** distribute heated or cooled air into a space. They operate very quietly. See next page for options.

**Refrigerant lines** are small insulated tubing that connect ductless heads and outdoor units. Coordinate placement and color with your installer.

**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

**Thermostats** Some thermostats can operate both heat pumps and other heating systems.

**Outdoor units** operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

**Window and door** upgrades can improve comfort and efficiency.
Ductless Heat Pumps

**key considerations**

Many options for indoor fan coils or “heads” are available. For optimal comfort and efficiency, each head should be sized to meet specific heating and cooling needs. Your heat pump installer can suggest the best options based on those needs plus size and configuration of the space.

1. **Low-wall or floor mount** units may be installed where radiators once were. Do not block them with furniture.
2. **High-wall** are the most common and versatile.
3. **Recessed** can be flush with ceilings or walls. Ask your installer about installation and maintenance.

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### Features

- Among simplest and least expensive heat pump system to install
- Control temperature in different areas of the home
- Quiet and efficient operation
- Eliminate window air conditioners

### Types of Ductless Heads

### Ask Your Installer

- What size units do I need? **Ask for room-by-room heating and cooling calculations.**
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each head? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

### Cost Considerations

#### Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- Ductless heat pumps are among the simplest and least expensive to install
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

#### Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane, electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

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Ducted Heat Pumps for a Two-Story Home

Heat pumps use electricity to provide clean, efficient heating and cooling.

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- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes
Ducted Heat Pumps

Features

- Heating and cooling distributed throughout the home with new or existing ducts
- No wall-mounted indoor units
- Quiet and efficient operation
- Eliminate window air conditioners

Air Handler Options

Air handler equipment moves warm or cool air through ducts. Your installer can guide you to the best options based on heating and cooling needs, existing systems, and home configuration.

Conventional air handlers move air through larger ducts. They are often located in basements, attics, or utility closets. They can be installed to blow air upwards, downwards, or sideways to fit within your home.

Compact ducted air handlers usually serve smaller areas such as one to three rooms. Their slim profile means they often fit in dropped ceilings, but leaving access for maintenance is important.

Ask Your Installer

- Will proper heating and cooling get to each space? Ask for room-by-room heating and cooling calculations.
- Are my ducts big enough for a heat pump? What modifications are needed?
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Cost Considerations

Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- If your home has ducts that can be reused, installation costs will be lower
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

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**Multi-Zone Heat Pump for a Two-Story Home**

- **Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.
- **Air handlers** distribute warm or cool air through ducts.
- **Ducts** carry warm or cool air to rooms. Existing ducts can often be modified and reused. Ducts work best in insulated spaces. Ask your installer to pay special attention to insulation and duct sealing.
- **Refrigerant lines** are small, insulated tubing that connect each air handler and/or ductless head to the outdoor unit. Coordinate placement and color with your installer.
- **Outdoor units** operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice. **Multi-zone** means multiple air handlers, ductless heads, or a combination connected to a single outdoor unit.
- **Thermostats** Some thermostats can operate both heat pumps and other heating systems.
- **Ductless heads** distribute heated or cooled air into a space. They operate very quietly.
Multi-Zone Air Source Heat Pumps

Features

- Save space outdoors with multiple indoor units connected to one outdoor unit
- Control temperature in different areas of the home
- Options for both ducted and ductless heating and cooling
- Quiet and efficient operation
- Eliminate window air conditioners

Types of Indoor Units

Multi-zone heat pumps allow you to “mix and match” ducted air handlers and ductless “heads.” Each should be sized to meet specific heating and cooling needs of the space it serves. Your installer can suggest the best options based on those needs, configuration of the home, and location of ducts (if present). Options include:

- High-wall ductless heads are among the most common and versatile.
- Low-wall ductless heads may be installed where radiators once were. Do not block them with furniture.
- Ducted air handlers come in a wide range of configurations. Some serve a single room; others can serve most of a home.

Each indoor unit can have its own thermostat, but all indoor units connect to a single outdoor unit.

Ask Your Installer

- What size units do I need? Ask for room-by-room heating and cooling calculations.
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each indoor unit? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating the outdoor unit(s)?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Cost Considerations

Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- Each zone adds cost, so use fewer zones when practical
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: nyserda.ny.gov/HeatPumpPlanner

This document is part of NYSERDA’s Heat Pump Planner.
**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Ducts** distribute warm or cool air to rooms. Existing ducts can often be modified and reused. Ducts work best in insulated spaces. Ask your installer to pay special attention to insulation and duct sealing.

**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

**Ground Loop** Underground pipes exchange heat with the ground. See next page for options.

**Ground Source Heat Pump for a Two-Story Home**

**Geothermal Heat pumps** use electricity to provide clean, efficient heating and cooling.

- **Ground source**, or Geothermal, systems heat and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, and no window air conditioners
- **Affordable** with rebates, financing options, or operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Ducts** extract heat from the ground loop, and a blower moves heated air through the ducts. In the summer, the heat pump operates in reverse and distributes cool air to the home.

**Window and door** upgrades can improve comfort and efficiency.
Ground Source Heat Pumps

**Features**
- Highest efficiency with lowest operating costs
- Quiet with no outdoor condensers or window air conditioners
- Heating and cooling distributed throughout the home with new or existing ducts
- Can also provide water heating

**Ground Loop Types**
Underground pipes exchange heat between the heat pump and the ground. Your installer will determine the proper type and size of ground loop based on:
- Land area available
- Type of rock or soil
- Heating and cooling needs of the home

There are two main types of loops.

**Ask Your Installer**
- Will proper heating and cooling get to each space?
  *Ask for room-by-room heating and cooling calculations.*
- Are my ducts big enough for a heat pump? What modifications are needed?
- How long will installation take? Where and when will you need access?
- Who is responsible for landscaping after the ground loop is installed?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

**Cost Considerations**

**Installation Cost**
- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- While ground source heat pumps are the most efficient, they are also more expensive to install
- Cost varies with region, installation complexity, installer experience, system size, and manufacturer

**Operating Cost**
- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: [nyserda.ny.gov/HeatPumpPlanner](http://nyserda.ny.gov/HeatPumpPlanner)
Ground Source, Hydronic Heat Pump for a Two-Story Home

Geothermal heat pumps use electricity to provide clean, efficient heating and cooling.

- **Ground source**, or Geothermal, systems provide comfort all winter across New York State
- **Hydronic systems** send warm water to heating devices throughout the home
- **Healthy and safe** with no fuels or carbon monoxide risks
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with low greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Baseboard or panel heaters** come in many shapes and sizes to heat different rooms.

**Fan coils** can provide cooling and additional heating. They can serve individual rooms or be ducted to several rooms.

**Window and door upgrades** can improve comfort and efficiency.

**Pipes** carry warm water to heating devices throughout the home. Copper, iron, and certain plastics are viable pipe materials.

The **heat pump** extracts heat from the ground loop to make warm water. In the summer, it operates in reverse to provide cooling.

**Radiant floors** heat rooms using warm water in pipes beneath the floor.

**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

**Ground Loop** Underground pipes exchange heat with the ground.

**Fan coils** can provide cooling and additional heating. They can serve individual rooms or be ducted to several rooms.

**Baseboard or panel heaters** come in many shapes and sizes to heat different rooms.

**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Pipes** carry warm water to heating devices throughout the home. Copper, iron, and certain plastics are viable pipe materials.

The **heat pump** extracts heat from the ground loop to make warm water. In the summer, it operates in reverse to provide cooling.
### Features

- Quiet with no outdoor condensers
- Can also provide hot water for bathing, washing, cooking, etc.
- Comfort from warm water heat throughout the home
- Air ducts are not necessary

### Heat Delivery Options

Heat pumps provide warm water rather than hot water, and conventional baseboards and radiators are often not sufficient. Heating devices designed for warm water are needed to provide comfort. Your installer can suggest the best heat delivery options based on your heating needs.

#### Heating Only

1. **Baseboards** designed for warm water can comfortably heat rooms.
2. **Panels** are available in many shapes and sizes and can be mounted in various positions.
3. **Radiant floors** provide uniform comfort.

#### Heating and Cooling

4. **Fan coils** provide cooling and can supplement other heating devices. These can serve single spaces or be ducted to several rooms.

### Ask Your Installer

- Will proper heating and cooling get to each space? **Ask for room-by-room heating and cooling calculations.**
- Do I need to upgrade radiators or baseboards?
- Will the system use “outdoor reset” control to optimize efficiency and comfort?
- How long will installation take? Where and when will you need access?
- Who is responsible for landscaping after the ground loop is installed?
- How do I operate my system for optimal comfort and efficiency?
- What annual maintenance is required?
- What is the expected lifespan and warranty?

### Cost Considerations

#### Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options. Larger incentives may be available for eligible customers.
- Ground source heat pumps may have a high upfront cost but will operate efficiently over a long lifetime.
- Cost varies with region, installer experience, heat delivery options, system size and manufacturer.

#### Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane or electric baseboard.
- If you previously heated with fuel, don’t be surprised to see electric bills rise. Your gas, oil, or propane bills will drop or disappear.
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs.

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Learn more at: [nyserda.ny.gov/HeatPumpPlanner](http://nyserda.ny.gov/HeatPumpPlanner)
Ductless Heat Pump for a Manufactured or Mobile Home

Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Insulation and air sealing** are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Ductless heads** distribute heated or cooled air into a space. Additional heads can serve other spaces. They operate very quietly. See next page for options.

**Outdoor units** operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

**Window and door** upgrades can improve comfort and efficiency.

**Electric service** may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

**Refrigerant lines** are small, insulated tubing that connect ductless heads and outdoor units. Coordinate placement and color with your installer.

**Heat pumps** use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes
Ductless Heat Pumps

key considerations

Many options for indoor fan coils or “heads” are available. For optimal comfort and efficiency, each head should be sized to meet specific heating and cooling needs. Your heat pump installer can suggest the best options based on those needs plus size and configuration of the space.

1 Low-wall or floor mount units may be installed where radiators once were. Do not block them with furniture.
2 High-wall are the most common and versatile.
3 Recessed can be flush with ceilings or walls. Ask your installer about installation and maintenance.

Features

- Among simplest and least expensive heat pump system to install
- Control temperature in different areas of the home
- Quiet and efficient operation
- Eliminate window air conditioners

Types of Ductless Heads

Ask Your Installer

- What size units do I need? Ask for room-by-room heating and cooling calculations.
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each head? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Cost Considerations

Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- Ductless heat pumps are among the simplest and least expensive to install
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: nyserda.ny.gov/HeatPumpPlanner

This document is part of NYSERDA’s Heat Pump Planner.
Outdoor units operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

Electric service may need to be upgraded to support heat pumps. Ask your installer to evaluate your service.

Insulation and air sealing are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

Air handlers distribute warm or cool air through ducts. See next page for typical options.

Ducts distribute warm or cool air to rooms. Existing ducts can often be modified and reused. Ducts work best in insulated spaces. Ask your installer to pay special attention to insulation and duct sealing.

Window and door upgrades can improve comfort and efficiency.

Refrigerant lines are small, insulated tubing that connect air handlers and outdoor units. Coordinate placement and color with your installer.

Outdoor units operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice.

Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes
Ducted Heat Pumps

Features

- Heating and cooling distributed throughout the home with new or existing ducts
- No wall-mounted indoor units
- Quiet and efficient operation
- Eliminate window air conditioners

Air Handler Options

Air handler equipment moves warm or cool air through ducts. Your installer can guide you to the best options based on heating and cooling needs, existing systems, and home configuration.

Conventional air handlers move air through larger ducts. They are often located in basements, attics, or utility closets. They can be installed to distribute air upwards, downwards, or sideways to fit within your home.

Compact ducted air handlers usually serve smaller areas such as one to three rooms. Their slim profile means they often fit in dropped ceilings, but leaving access for maintenance is important.

Ask Your Installer

- Will proper heating and cooling get to each space? *Ask for room-by-room heating and cooling calculations.*
- Are my ducts big enough for a heat pump? What modifications are needed?
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Cost Considerations

Installation Cost

- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- If your home has ducts that can be reused, installation costs will be lower
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

Operating Cost

- Your overall heating costs will likely decrease if switching from oil, propane or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: [nyserda.ny.gov/HeatPumpPlanner](http://nyserda.ny.gov/HeatPumpPlanner)
Ductless Heat Pump for an Apartment

Heat pumps use electricity to provide clean, efficient heating and cooling.

- **Proven technology** heats and cools homes year-round across New York State
- **One system** provides comfort in both summer and winter
- **Healthy and safe** with no fuels, carbon monoxide, or window air conditioners
- **Affordable** with rebates, financing options, and low operating costs
- **Clean and green** with reduced greenhouse gas emissions
- **Versatile** solution for new or existing homes

**Ductless heads**
Distribute heated or cooled air into a space. They operate very quietly. See next page for options.

**Insulation and air sealing**
Are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

**Window and door**
Upgrades can improve comfort and efficiency.

**Thermostats**
Some thermostats can operate both heat pumps and other heating systems.

**Outdoor units**
Operate very quietly. They can be mounted on the ground (on stands), on wall brackets, or sometimes on roofs. They must be above snow and shielded from excessive water or ice.

**Refrigerant lines**
Are small, insulated tubing that connect ductless heads and outdoor units. Coordinate placement and color with your installer.
Ductless Heat Pumps

Key Considerations

**Features**
- Among simplest and least expensive heat pump system to install
- Control temperature in different areas of the home
- Quiet and efficient operation
- Eliminate window air conditioners

**Types of Ductless Heads**
Many options for indoor fan coils or “heads” are available. For optimal comfort and efficiency, each head should be sized to meet specific heating and cooling needs. Your heat pump installer can suggest the best options based on those needs plus size and configuration of the space.

1. **Low-wall** or floor mount units may be installed where radiators once were. Do not block them with furniture.
2. **High-wall** are the most common and versatile.
3. **Recessed** can be flush with ceilings or walls. Ask your installer about installation and maintenance.

**Ask Your Installer**

- What size units do I need? **Ask for room-by-room heating and cooling calculations.**
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each head? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating each outdoor unit?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

**Cost Considerations**

**Installation Cost**
- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers.
- Ductless heat pumps are among the simplest and least expensive to install.
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience.

**Operating Cost**
- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard.
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, gas, oil, or propane bills will drop or disappear.
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs.

Learn more at: nyserda.ny.gov/HeatPumpPlanner

This document is part of NYSERDA’s Heat Pump Planner.
Insulation and air sealing are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

Air handlers distribute warm or cool air through ducts.

Ducts distribute warm or cool air to rooms. Existing ducts can often be modified and reused. Ducts work best in insulated spaces. Ask your installer to pay special attention to insulation and duct sealing.

Air handlers distribute warm or cool air through ducts.

Ductless heads distribute heated or cooled air into a space. They operate very quietly.

Thermostats Some thermostats can operate both heat pumps and other heating systems.

Outdoor units operate very quietly. They must be above snow, away from other obstructions, and shielded from excessive water or ice. Multi-zone means multiple air handlers, ductless heads, or a combination connected to a single outdoor unit.

Refrigerant lines are small, insulated tubing that connect each air handler and/or ductless head to the outdoor unit. Coordinate placement and color with your installer.

Insulation and air sealing are often important first steps. This saves money, improves comfort, and makes heat pumps more effective.

Window and door upgrades can improve comfort and efficiency.

- Proven technology heats and cools homes year-round across New York State
- One system provides comfort in both summer and winter
- Healthy and safe with no fuels, carbon monoxide, or window air conditioners
- Affordable with rebates, financing options, and low operating costs
- Clean and green with reduced greenhouse gas emissions
- Versatile solution for new or existing homes

Multi-Zone Heat Pump for a Townhome

Heat pumps use electricity to provide clean, efficient heating and cooling.

HEAT PUMP PLANNER

MORE ABOUT MULTI-ZONE HEAT PUMPS >
Multi-Zone Air Source Heat Pumps

Features
- Save space outdoors with multiple indoor units connected to one outdoor unit
- Control temperature in different areas of the home
- Options for both ducted and ductless heating and cooling
- Quiet and efficient operation
- Eliminate window air conditioners

Types of Indoor Units
Multi-zone heat pumps allow you to “mix and match” ducted air handlers and ductless “heads.” Each should be sized to meet specific heating and cooling needs of the space it serves. Your installer can suggest the best options based on those needs, configuration of the home, and location of ducts (if present). Options include:

- **High-wall ductless heads** are among the most common and versatile.
- **Low-wall ductless heads** may be installed where radiators once were. Do not block them with furniture.
- **Ducted air handlers** come in a wide range of configurations. Some serve a single room; others can serve most of a home.

Each indoor unit can have its own thermostat, but all indoor units connect to a single outdoor unit.

Ask Your Installer
- What size units do I need? **Ask for room-by-room heating and cooling calculations.**
- Can heat pumps sufficiently heat my home or is an additional system needed?
- What is the best location for each indoor unit? Can we avoid heads directly above where people sit or sleep?
- What are my options for locating the outdoor unit(s)?
- How long will installation take? Where and when will you need access?
- How do I operate my system for optimal comfort and efficiency?
- What maintenance is required? How often should I clean or change air filters? Is annual service needed?
- What is the expected lifespan and warranty?

Cost Considerations

### Installation Cost
- Check with NYSERDA, your electric company, and installer for incentives and financing options as larger incentives may be available for eligible customers
- Each zone adds cost, so use fewer zones when practical
- Cost varies with region, heat pump size, manufacturer, installation complexity, and installer experience

### Operating Cost
- Your overall heating costs will likely decrease if switching from oil, propane, or electric baseboard
- If you previously heated with fuel, don’t be surprised to see electric bills rise; however, oil, or propane bills will drop or disappear
- Efficient homes (windows, doors, insulation, air sealing) have much lower operating costs

Learn more at: nyserda.ny.gov/HeatPumpPlanner

This document is part of NYSERDA’s Heat Pump Planner.
Heat Pump Water Heater in an Unfinished Basement

Heat pump water heaters (HPWHs) use electricity to provide hot water efficiently and reliably.

- **Efficient**, uses one third the energy of most other water heaters
- **Healthy and safe** with no fuels, no carbon monoxide risk
- **Affordable** with rebates and low operating costs
- **Sustainable** with low greenhouse gas emissions
- **Widely available** from plumbers and large retail stores
- **Long-lived** with warranties up to 10 years
- **Relatively simple** to install without major disruptions

The heat pump water heater extracts heat from surrounding air to heat water.

WaterSense® faucets, aerators, and showerheads use less water and reduce water heating cost.

Pipe Insulation reduces heat loss and saves energy.

ENERGY STAR® clothes washers and dishwashers use less water and energy. Combining efficient appliances, fixtures, and pipe insulation will maximize savings.
Heat Pump Water Heater in an Unfinished Basement

Size and Location Considerations

**Tank Size** Consider a HPWH with a larger tank if you have space. Most HPWHs include a less efficient backup heater. With a larger tank, you’ll need this backup much less often.

- 1–3 people: 50 GAL
- 2–4 people: 65 GAL
- 4+ people: 80 GAL

**Location** HPWHs are taller than many water heaters, and they often work well in open areas. Talk to your installer about space needed around your water heater.

**Temperature** HPWHs work best with warm intake air, but they cool and dehumidify the space around them. Locate HPWHs where cool air won’t cause discomfort.

**Sound** HPWHs are louder than other water heaters – similar to some basement dehumidifiers. Be aware if locating them near living spaces.

**Ask Your Installer**
- Is a HPWH with a larger tank appropriate for my home?
- Is my ceiling high enough for this water heater?
- What is the sound rating of the water heater? Will noise be disruptive where it’s located?
- Do I need an anti-vibration pad?
- When the HPWH dehumidifies air, how will that water be drained? Do I need a condensate pump?
- Do I need any electrical upgrades to support a HPWH?
- Will you insulate all hot water pipes?
- Are there various operating modes? How are these adjusted? Which mode is most efficient?
- What maintenance is required? Are there filters that I need to clean or change?

**Cost Considerations**
- Check with NYSERDA, your electric company, and installer for incentives and tax credits.
- Installation costs vary with region, equipment, installation complexity, and installer experience.
- Hot water costs will likely decrease – sometimes significantly – compared to conventional gas, propane, oil, and electric water heaters.
- If you previously heated with fuel, don’t be surprised to see electric bills rise. Your gas, oil, or propane bills will drop.
- Efficient appliances, faucets, and showerheads will lower costs even more.

Learn more at: [nyserda.ny.gov/HeatPumpPlanner](http://nyserda.ny.gov/HeatPumpPlanner)