HEAT PUMPS - RESOURCES AND INFORMATION FOR EASTHAM HOMEOWNERS

I. Who Is This Guide For

You currently heat your home by burning a fossil fuel - heating oil, natural gas, or propane. Your furnace is about 15 years old and ready for replacement along with the hot water tank that's heated by the furnace. You might use window air conditioners to cool your home in the summer. They are also near the end of their useful life, noisy, and need to be installed every summer. Although your old furnace might keep chugging through its 20th or 25th birthday, it will be costing you more in maintenance and oil each year, since it's not nearly as efficient or reliable as today's systems. Studies show that if you start needing repairs, hear funny noises or smells, or see your fuel usage increasing, it is likely time to start researching a replacement.

If you are in this position (or close to it), you basically have two options --- replace your current system with new versions of the same equipment, or switch to a heat pump system. You probably know already that the replace or switch decision is tougher than it used to be. This is a good thing. Big improvements over the last decade mean heat pumps can now cover all home needs—heating and cooling your living space, and providing hot water—well and efficiently in the Cape Cod climate (and even colder areas). You will likely see significant yearly savings especially if you are currently heating with oil, electric baseboard, or even propane.

REPLACE

OR

SWITCH

So, what are the differences between the types of systems that will matter to you? There are two ways to answer that question:

#1: Check a few good websites to find the right questions and answers.
There's a lot of content on the web, but homing in on the good stuff can be challenging. We've done some legwork to save you time and connect you with current, reliable sites.

#2: See how your options compare for a hypothetical Eastham home.
A new simulation tool, the *Green Upgrade Calculator,* allows you to see how a heat pump system's performance will compare to the alternatives. We will show you simulation results for the hypothetical Eastham home.

II. Useful Resources for Information about Heat Pumps

The sites below explain how heat pumps work, describe their benefits for energy use and the environment, and provide information on financial incentives and financing.

For a great introduction to heat pumps, head to the Green Energy Consumers Alliance. This site includes a link to a video on YouTube that goes over heat pump basics as well as links to information about finding installers, taking advantage of rebates and incentives, and a set of FAQs. The Alliance is a nonprofit organization based in Massachusetts and Rhode Island.

Green Alliance Primer Video on YouTube

Massachusetts Clean Energy Center. This Massachusetts-sponsored economic development agency aims to facilitate a clean energy transition that meets the state's climate goals, spurs job creation, and secures long-term economic growth for the Commonwealth. In addition to extensive information about heat pumps, this site offers a simple calculator to estimate the cost of installing a heat pump in your home.

MassSave. This website provides information on rebates and incentives for heat pumps, part of its service as a collaborative of Massachusetts 'electric and natural gas utilities and energy efficiency service providers.

Cape Light Compact. A nationally recognized award-winning energy services organization operated by the 21 towns on Cape Cod and Martha's Vineyard and Dukes County. The Compact's mission is to serve its 210,000 customers through the delivery of proven energy efficiency programs, effective consumer advocacy and renewable competitive electricity supply. This website provides information on heat pump benefits and rebate and financing programs.

Brookline and Somerville. These two Massachusetts communities have excellent summaries of how heat pumps work, their benefits for energy use and the environment, and answers to questions about heat pump suitability for New England winters.

III. Options Comparison for the Eastham Home

Developed by RMI[1], a highly regarded energy research organization, the *Green Upgrade Calculator* simulates how different heating/cooling systems will perform. Using inputs for a given home (such as year built, square footage, number of floors) the *Calculator* returns estimates of annual operating costs, annual energy use, and carbon dioxide emissions over the life of the equipment. (If you want to give it a try for your home, go to RMI Calculator.)

[1] In 1982, Rocky Mountain Institute (RMI) was founded as a 501(c)3 nonprofit aiming to improve America's energy practices. RMI's data-led analyses focus on efficiency, whole systems analysis, and levering business to drive change.

Before you take that step, take a look at the table below. It shows estimates for a "hypothetical" Eastham home. See the next page for definitions of terms and other details.

Estimates for a Hypothetical Eastham Home

	HVAC Type & Fuel				
	Heat Pump	Fuel Oil	Natural Gas	Propane	Electric Resistance
First Year Operating Cost (all utilities)	$3,890	$4,387	$3,759	$4,641	$9,311
Total Annual Energy consumption (MMBtus)	21	72	67	66	56
Lifetime CO2 Emissions (metric tons over 15 years)	36	103	87	93	66

What does the comparison tell us?

- ✓ **The total annual cost of utilities in a home with a heat pump system is lower than in homes heated by fuel oil, propane, or electric baseboards**, and only slightly higher than in a home heated by natural gas. The table reflects a recent, very important change in energy rates. Massachusetts Dept. of Public Utilities has authorized lower winter electric rates for homes with heat pumps. It estimates an average electric bill savings of $540 (Boston Globe, Aug. 4, 2025, p. D1).
- ✓ **The heat pump home uses much less total energy** for heating, cooling, and hot water—around one-third the energy required for fuel oil, propane or natural gas.
- ✓ **Lifetime carbon emissions are the highest in a home heated by fuel oil** and the lowest by a considerable amount in a home with heat pumps. (If the home has solar panels, lifetime carbon emissions are virtually nil.)

IV. How Much Will It Cost to Switch

One question of primary interest is which system will cost less to acquire and install. The answer is "it depends." Cost estimates will vary with the specific configuration of a home, the specific equipment chosen, and the competitive state of the market. Although there are significant state rebates, federal tax incentives are scheduled to expire at the end of 2025. Changes in tariffs are likely affecting the cost of equipment, whether imported or manufactured domestically. If demand falls, local HVAC and heat pump contractors may be willing to offer better deals to keep their businesses viable.

While the answer regarding cost is “it depends”, it is clear that heat pumps use much less energy and generate much lower carbon emissions, even when powered by electricity from the grid that is not 100% clean. Those advantages may be worth some additional financial cost to the homeowner, or not. Hopefully this guide is useful for seeing the tradeoffs.

V. Definitions for Simulations

The hypothetical Eastham home used in the simulations is a detached, single family structure, built between 1980 and 2000, with two stories and 1500 to 2000 square feet of living space, using window AC units for summer cooling and a hot water tank connected to the furnace. The heat pump system consists of an external heat pump and four indoor mini split units[2] plus a heat-pump hot water tank to replace the existing tank. (Changing the home’s specifications will change the specific numbers generated, but their relative relationships stay very much the same.) The simulations us local energy costs - Eversource’s standard residential rate ($0.33/kwh), $3.80/gal for fuel oil, $1.98/ccf + $11.40/mo for natural gas, and $3.54/gal for propane. Fluctuations in these rates will change the estimated operating costs for the different fuels.

The table reports simulation results from the Green Upgrade Calculator for the home’s

- annual energy cost for heating, cooling, and hot water,
- carbon dioxide emissions over the life of the new equipment, assumed to be 15 years, measured in metric tons of CO2 equivalents (MTCO2e)[3]
- total annual energy consumption for heating, cooling and hot water (electricity plus the existing fuel) measured in millions of British thermal units (MMBtus)[4]

[2] An external heat pump can also be connected to existing heating or cooling ducts.

[3] Reducing carbon emissions by 1 metric ton is equivalent to burning 113 fewer gallons of gasoline.

[4] A British thermal unit is the amount of energy (heat) needed to raise the temperature of a gallon of water by 1 degree.