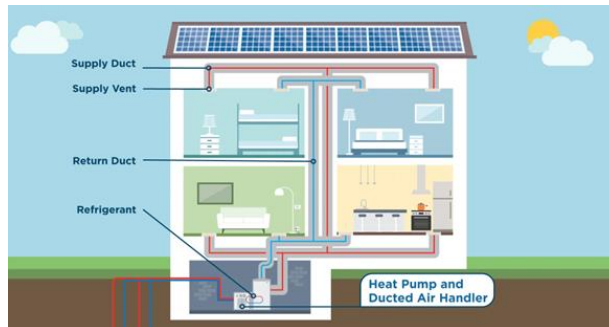




SUSTAINABLE SHERBORN

EDUCATE - COLLABORATE - TAKE ACTION



The Most Efficient Heating & Cooling System

Sherborn's Energy and Sustainability Committee Newsletter

This ongoing newsletter offers specific information about energy-cost savings, improving your home and making Sherborn more sustainable and resilient.

Heating & Cooling with Ground Source Heat Pumps (GSHPs)

Overview

GSHPs are frequently referred to as “geothermal” and less common than air source heat pumps (ASHPs). However, GSHPs are the most energy efficient system for heating and cooling one's home. Further, they offer superior comfort compared to the more commonly installed ASHPs. There are also both federal and state financial incentives that make them far more affordable to install.

How they work

GSHPs take advantage of the year-round consistent ground temperature (50F in our area below the frostline) via an underground heat exchanger. This heat exchanger consists of many hundreds of feet of sprinkler pipe that circulates a water-antifreeze solution. The heat is then extracted from this fluid and used to condition one's home during the heating season. The system essentially runs in reverse during the cooling season where heat from the home is instead dumped into the fluid that in turn deposits the heat underground. This 50F thermal reservoir offers a significant operating efficiency advantage compared to ASHPs that need to work harder as the air temperature gets colder; the reverse is also true in the summer.

Domestic hot water heating bonus

GSHP systems frequently include a desuperheater. This equipment can provide your home with most of your hot water needs for very little additional energy consumption beyond what it already takes for the GSHP to run. This benefit is frequently underappreciated but can save you a lot of money. In the winter, the GSHP desuperheater transfers heat from the ground to your hot water tank; conversely in the summer, some of the heat from your home is transferred into this same hot water tank.

Operating costs

GSHPs have the lowest operating costs of all heating systems, whether they be oil, gas, propane, electric, or ASHPs. GSHPs run on electricity, which means no more oil bills! However, they will increase your electricity bill. Importantly, you can zero out these electricity costs by installing or adding more solar panels to your property. The efficiency of GSHPs is described using the coefficient of performance metric, or “CoP”. A common CoP range for GSHPs is 3 to 5^{1,2}. This means that for every unit of energy (i.e. electricity) the system consumes, you get 3X to 5X amount of energy output as heat. For reference, an electric space heater or electric baseboard gives you 1X output as heat energy compared to what it consumes.

Installation costs and rebates

GSHPs have larger installation costs than most other systems. However, because of their energy efficiency, the federal government currently offers a tax credit equal to 30% of the system cost³. Additionally, Massachusetts offers a \$4,500/ton rebate for a new GSHP system.⁴

Final thoughts

To avoid burning fossil fuels and tackle climate change, we all need to eventually switch to some type of heat pump. Please consider GSHPs, *i.e.* geothermal, for their efficiency and exceptional comfort. They have been made more affordable thanks to generous federal and state incentives. In Sherborn, there are already quite a few GSHP systems installed. We’d be happy to put you in touch with your fellow GSHP-owning residents to learn about them. If interested, please email: esc@sherbornma.org.

Heat Pumps Installation & How to Find a Competent Installer

Modern heat pumps can give homeowners more for less, creating more comfortable homes that use less energy and produce less pollution. The challenge is that heat pumps can live up to that potential only when they’re installed correctly. This article not only offers important information on heat pumps systems but also on where to look and what to demand from your contractor.

Massachusetts Clean Energy Center: Geothermal Heat Pump Information

This site provides relevant information on clean energy solutions, benefits & savings, installers, resources, and customer stories.

US Department of Energy Geothermal Heat Pumps

Technical information as well as benefits and drawbacks of Geothermal Heat Pumps

Is a Geothermal Heat Pump Worth It? My Net Zero Home

An article that explores the cost and benefits of Geothermal Heat Pump systems, whether they are right for you, and the cost & payback of these systems (October 2023)

Mass Save: Ground Source Heat Pump Incentives

For information on how residents can take advantage of federal tax credits to lower the price of purchasing and installing a ground source heat pump. Greater discounts and no-cost options are also available to income-qualifying customers.

HeatSmart Alliance Free Residential Heat Pump Coaching

To connect with a home heating and cooling coach to discuss your needs and how heat pumps can address them, feel free to contact the HeatSmart Alliance. They can then identify a coach who will work with you as an independent third party to help with the planning and contractor vetting process.

Other Energy-Saving Tips & Past Newsletters

Energy Star: Low- to No-Cost Tips for Saving Energy at Home

Tips to be more energy efficient, save money and reduce the risks of climate change.

Massachusetts Clean Energy Center (MassCEC)

A great source of useful information on all energy topics.

Previous Energy & Sustainability Newsletter Links

Access to previous Sherborn Energy & Sustainability Newsletters.

Citations

1. <https://www.waterfurnace.com/residential/products/geothermal-heat-pumps/>
2. <https://www.nrel.gov/docs/fy21osti/79479.pdf>
3. <https://www.energy.gov/eere/geothermal/tax-credits-incentives-and-technical-assistance-geothermal-heat-pumps>
4. <https://www.masssave.com/business/rebates-and-incentives/heating-and-cooling/heat-pumps/ground-source-heat-pumps>

