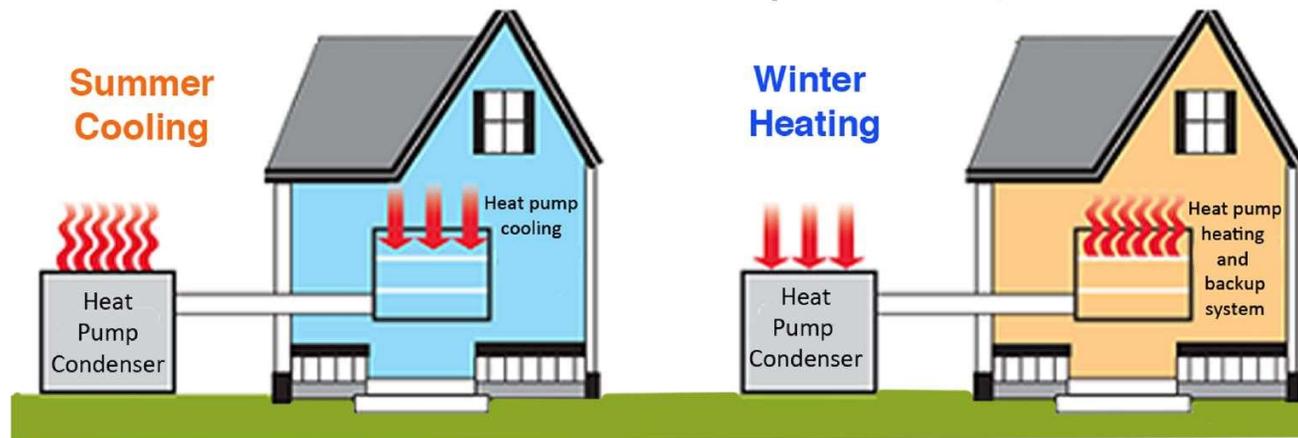


HVAC SEMINAR

Heating, Ventilation, AC

How Heat Pumps Work



Tuesday, May 2, 7:00 pm

Grantham Town Hall, Lower Level

WHY HIGH-EFFICIENCY HVAC?

- **Saves You Money**
 - Lower utility bills
 - Possible rebates for qualifying equipment
 - Eversource – only ENERGY STAR[®] certified qualify
 - See NHSaves website for more information
 - As of 4/20/17, ~45% of 2017 rebate funding is still available
- **Conserves Natural Resources**
- **Less Environmental Impact**

DID YOU KNOW...

... the energy used in the average house is responsible for twice as many greenhouse gas emissions as the average car?

IS IT TIME TO MAKE A CHANGE?

It's time to consider replacing your equipment with a high-efficiency unit that has earned the ENERGY STAR rating if your HVAC system is:

- old (10 – 15 years), or
- not working properly.

FURNACES



FURNACES

- Most commonly used residential heating system in the U.S.
 - Deliver heat through a duct system
 - Usually run on gas, but also run on oil, propane, electricity, or wood pellets
- ENERGY STAR Furnaces have higher AFUE (Annual Fuel Utilization Efficiency) ratings.
 - AFUE is the measure of heating equipment efficiency, represented as a percentage.
- Most furnaces qualifying for the ENERGY STAR:
 - Are “condensing” furnaces, where the transfer of heat is so efficient water or condensate is a byproduct of combustion. This condensing occurs with systems over 90 percent efficient.
 - Have a highly efficient blower motor (commonly an ECM, Electronically Commutated Motor, or other “advanced main air circulating fan”).

BOILERS



BOILERS

- Heats your home by burning gas, propane, oil or wood pellets to heat water or steam that circulates through radiators, baseboards, or radiant floor systems.
 - Boilers do not use a duct system.
- Boilers that have earned the ENERGY STAR have higher AFUE ratings.
- Features that improve boiler efficiency include:
 - electronic ignition, eliminating the need to have the pilot light burning all the time; and
 - technologies that extract more heat from the same amount of fuel.

CENTRAL AIR CONDITIONERS



CENTRAL AIR CONDITIONERS

- Most residential central ACs are called “split-systems”
 - Have an outdoor component with a condenser and compressor, and
 - An indoor component with an evaporator coil.
- ENERGY STAR – have higher SEER (Seasonal Energy Efficiency Ratio) and EER (Energy Efficiency Ratio) ratings.
 - SEER measures the efficiency of a cooling system’s operation over an entire season.
 - EER measures the efficiency of a cooling system when the outdoor temperature is a specific temp, 95 degrees F.
- Needs a blower motor—usually part of the furnace—to blow the cool air through the duct system.
 - Will only perform at its rated efficiency if the heating system is also high-efficiency, often replaced at the same time.

HEAT PUMPS – Electric Air-Source

Heat pumps can provide both heating and cooling in one integrated system.



HEAT PUMPS – Electric Air-Source

- Electric Air-Source Heat Pumps (ASHPs) are often used in moderate climates
 - use the difference between outdoor and indoor air temperatures to cool and heat.
- ENERGY STAR qualified ASHPs have:
 - higher SEER and EER ratings than conventional models; and
 - higher Heating and Seasonal Performance Factor (HSPF), which measures the heating efficiency of the heat pump.

NOISE CONSIDERATIONS

- Many of today's high-efficiency heat pumps and central air conditioners are much more quiet than older systems
 - Mini-split systems often among the quietest systems.
- Examples of “as low as” decibel levels:

Central or Heat Pumps:	Mini-Splits:
Lennox HSX15- 67 dB	Fujitsu Halcyon 12K BTU– 47 dB
Carrier Infinity 19VS – 56 dB	Mitsubishi 12KBTU- 49 dB
Lennox Elite XP20 Heat Pump– 65 dB	

VIDEO OF 2 RUNNING MITSUBISHI

Go to:

<https://www.youtube.com/watch?v=gRoKZo5kubE>

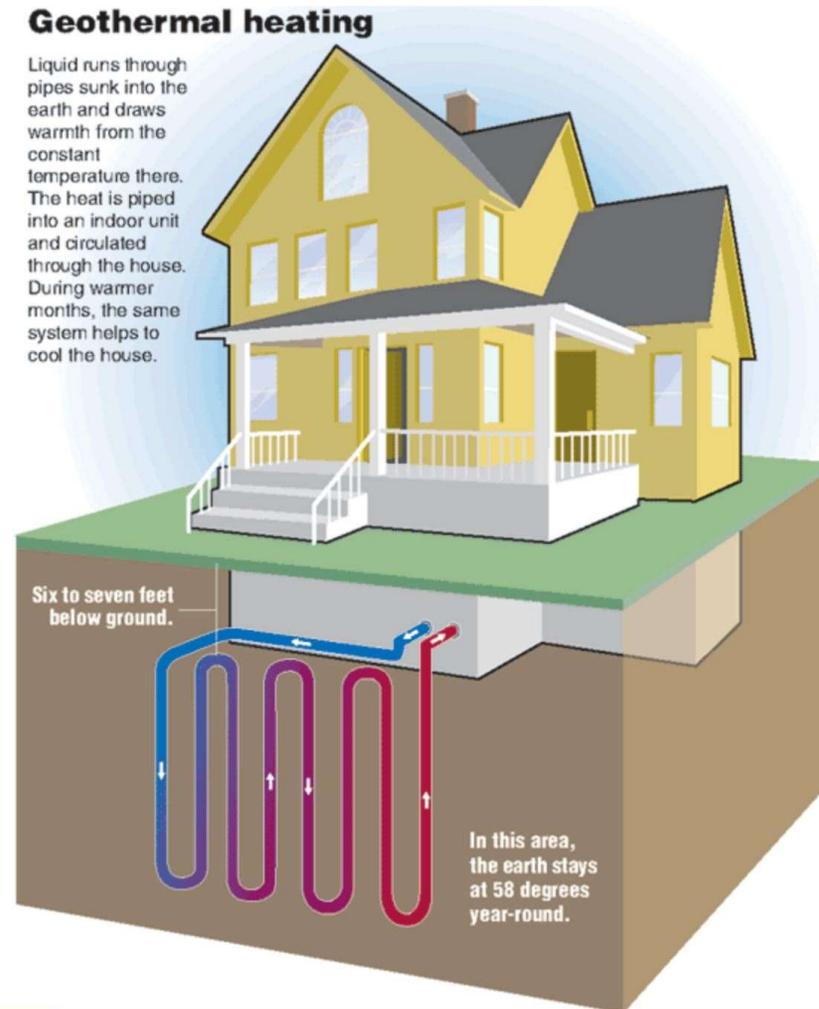


HEAT PUMPS – Geothermal



Geothermal heating

Liquid runs through pipes sunk into the earth and draws warmth from the constant temperature there. The heat is piped into an indoor unit and circulated through the house. During warmer months, the same system helps to cool the house.



HEAT PUMPS – Geothermal

- Geothermal Heat Pumps (GHPs) - similar to air-source heat pumps, but use the ground instead of outside air to provide heating, cooling, and often water heating.
 - Using the earth's natural heat makes GHPs among today's most efficient and comfortable heating and cooling technologies.
- Initially expensive, but they can achieve significant cost savings on energy bills.
- GHPs are most often installed in new homes and require a duct system.
- May not be feasible in all locations

PROGRAMMABLE THERMOSTATS

- Programmable Thermostats make it easy to save money & resources by offering multiple pre-programmed settings to regulate a home's temperature across seasons.
 - A way to automatically reduce costs of heating/cooling when it is not needed as much, e.g.,

Higher Demand/Need Times (Set at desired temperature)	Lower Demand/Need Times (Lower in winter & Raise in summer)
Wake up	Daytime
Evening	Sleeping

Tonight's Panel



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Newbury, NH 03255
603-759-WATER (9283)
2KEarthAndWater.com



ARC Mechanical Contractors, Inc.
1 Glen Rd #204
West Lebanon, NH 03784
(603) 443-6111
<http://www.arcmech.com>



Lyme Green Heat
PO Box 152
Lyme, NH 03768
603-359-8837
<http://lymegreenheat.com>



Simple Energy
112 N Main St
West Lebanon, NH 03784
(603) 298-7200
<http://simpleenergyonline.com>

**RESOURCES,
LINKS, &
BACKUP SLIDE**

RESOURCES & LINKS

- NHSAVES – nhsaves.com
- ENERGY STAR® - energystar.gov
- DOE – energy.gov
- EVERSOURCE 2017 Rebate Form –

<http://www.nhsaves.com/wp-content/uploads/2017/01/2017-Eversource-Residential-HeatingCooling-Water-Heating-Rebate.pdf>

OTHER HELPFUL LINKS

- <http://www.consumerreports.org/cro/central-air-conditioning/buying-guide>
- https://www.energystar.gov/index.cfm?c=most_efficient.me_cac_ashp
- <https://energy.gov/energysaver/central-air-conditioning>
- https://www.energystar.gov/about/federal_tax_credits/heating_ventilating_air_conditioning
- <https://www.energystar.gov/rebate-finder>
- <https://energy.gov/savings>
- <https://www.nhsaves.com/save-home/save-more/heating-cooling-water-heating-systems/>
- <https://www.nh.gov/oep/energy/saving-energy/rebates-incentives.htm>
- <https://energy.gov/eere/femp/energy-incentive-programs-new-hampshire>
- <https://www.eversource.com/Content/nh/residential/save-money-energy/energy-saving-programs-rebates/appliances>

AIR CONDITIONERS TYPES

Types of Air Conditioners



CENTRAL

A central air conditioner circulates cool air through a home using a system of ducts and registers.

LIFE SPAN: 15-20 years

COST

\$\$\$

CHOOSING YOUR A/C

A central A/C system will provide the most even cooling throughout the home. If already you have ductwork, it can be a cost-effective option.

PRO

Quiet, convenient to operate and more efficient than window units.

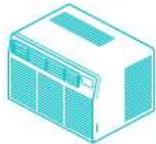
CON

Can be expensive to install if you don't have ductwork already.



TIP

Make sure your ductwork is properly sealed and connected without sags or excessive bends.



ROOM

The most popular cooling system, a room air conditioner provides spot cooling and can be either a window unit or a portable air conditioner.

LIFE SPAN: 10-15 years

COST

\$

CHOOSING YOUR A/C

If you don't currently have an air conditioner, a room unit can provide cooling to select spaces at an affordable cost.

PRO

Inexpensive way to cool a room or an addition to your home.

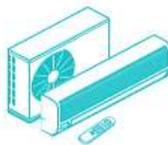
CON

Improper installation can result in significant air leakage – increasing it by as much as 10 percent.



TIP

Install rigid form panels in between the window frame and unit and secure with duct tape instead of the accordion panels to reduce air leakage.



DUCTLESS, MINI-SPLIT

Mounted on a wall, a ductless, mini-split air conditioner provides zoned cooling without the ductwork.

LIFE SPAN: 12-15 years

COST

\$\$\$\$

CHOOSING YOUR A/C

Ductless mini-splits can provide cooling as well as heating. They are highly efficient, work in all climate zones and can be an affordable alternative to installing a ducted system.

PRO

Easy to install and avoids energy loss associated with ductwork.

CON

Is expensive – In homes with existing ductwork, a mini-split can cost 30 percent more than adding an air conditioner unit to the existing system.



TIP

Keep the compressor (the part of the unit outside) clean to prevent overheating.



EVAPORATIVE COOLER

An evaporative cooler (also called a swamp cooler) cools outdoor air using evaporated water and circulates it throughout the house.

LIFE SPAN: 15-20 years

COST

\$\$

CHOOSING YOUR A/C

If you live in an arid climate, an evaporative cooler can be a cost-effective cooling option. In addition to cooling the air, they add moisture, which can improve comfort.

PRO

Costs about 1/3 as much to install and uses about 1/4 of the energy of a central air conditioner.

CON

Requires more frequent maintenance and is only suitable for areas with low humidity.



TIP

Regularly clean and drain your evaporative cooler to ensure it operates as efficiently as possible.