

Clean Heating and Cooling for Your Home

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January 24, 2023



About the HeatSmart Alliance



***Mission:** Reduce greenhouse gas emissions by accelerating the adoption of energy-efficient heat pumps in MA homes and buildings*

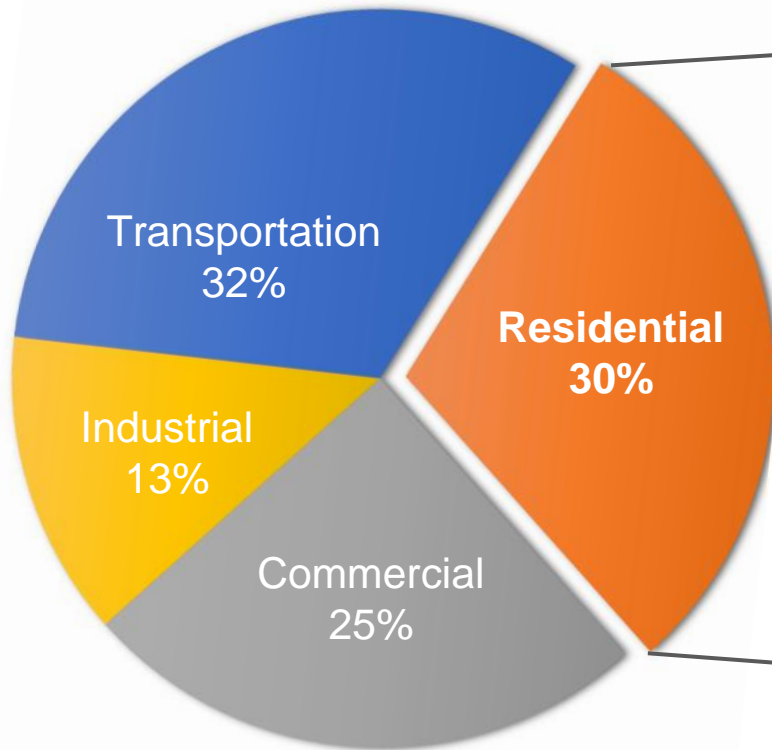
- **Applications:** Home heating and cooling, water heating
- All-volunteer organization
- 76 participants from 32 MA communities, and growing
- **Approach:** Educate / Coach / Collaborate

The Alliance does not accept donations or referral fees from installers or manufacturers

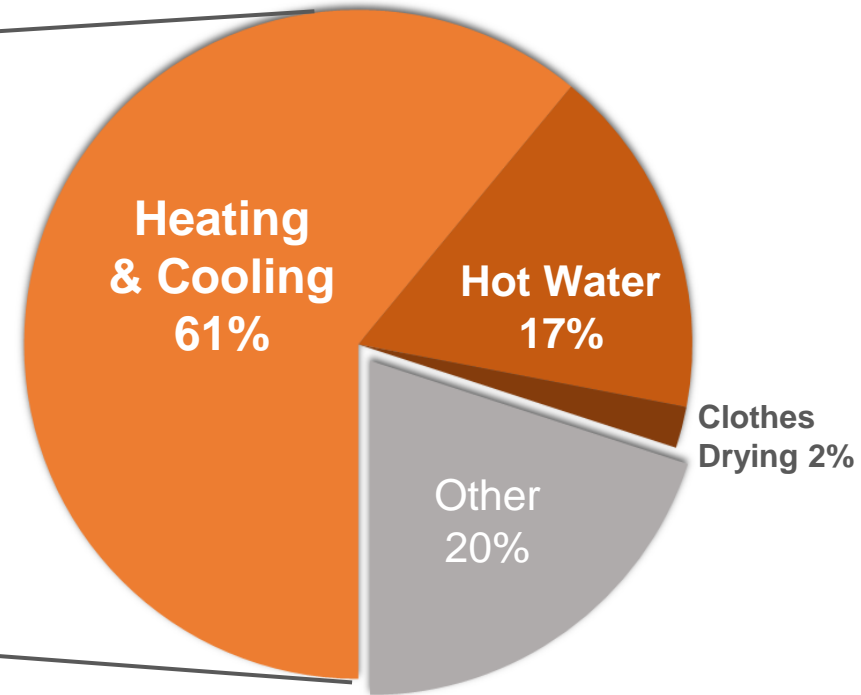
Why Heat Pumps?

Home Heating and Cooling Matters...

New England Energy Use*



Average Home Energy Use*

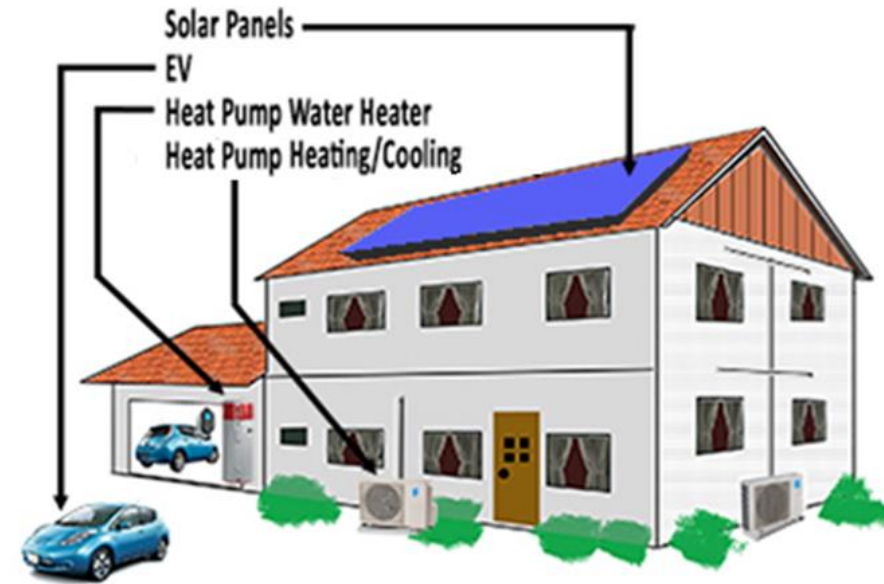


**About 80% of home energy needs
can be handled by heat pumps**

* Source: U.S. Energy Information Administration, <https://www.eia.gov>

Path to Home Decarbonization

1. Weatherize
– *insulate, air seal*
2. Electrify
3. Shift to renewable electricity



Renewable electricity ↑

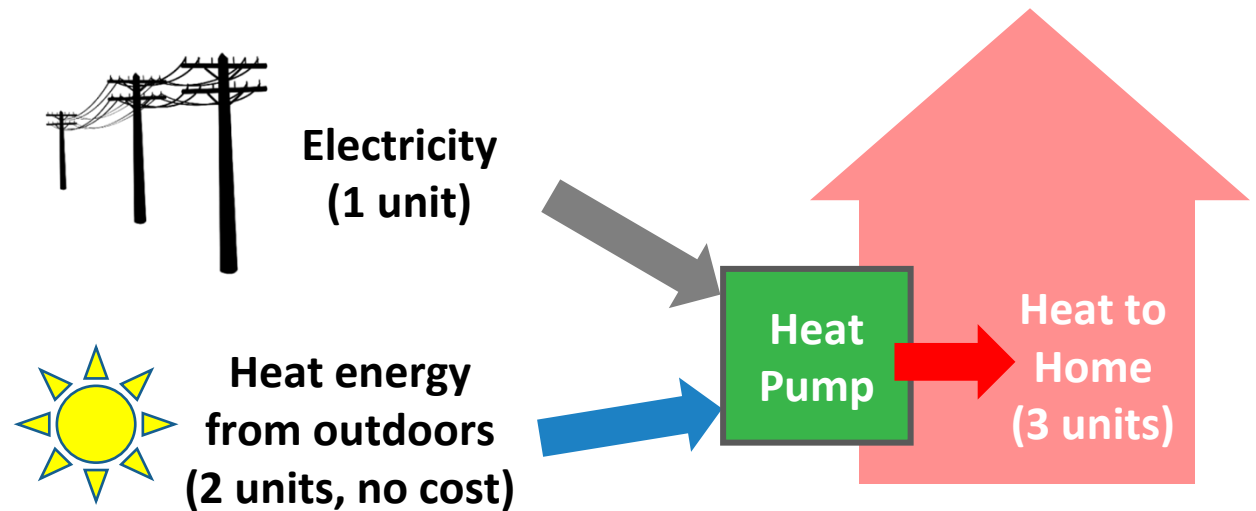


Insulation photo courtesy of NEEP



What's a heat pump?

- Moves (pumps) heat from a **cooler** place to a **warmer** place
- Refrigerators, dehumidifiers, and air conditioners are **heat pumps**
- Available for:
 - Home **heating** and **cooling**
 - Water heating
 - Clothes drying
 - Pool heating



Heat pumps provide **heating** AND **air conditioning**

Benefits of Heat Pumps in MA Homes

- ***Substantial reduction*** in greenhouse gas emissions
- A ***safer home*** (no risk of carbon monoxide or explosion)
- Superior ***year-round comfort*** (summer and winter)

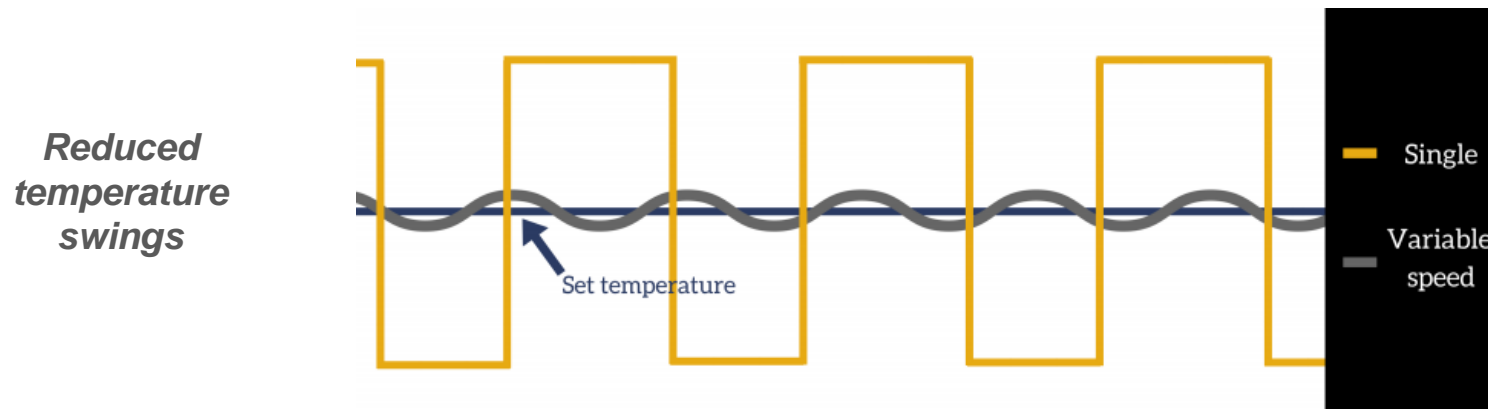


Illustration courtesy of NEEP

How Much Emissions Reduction?

2,000 sf home
Typical
construction

Ground-
Source HP

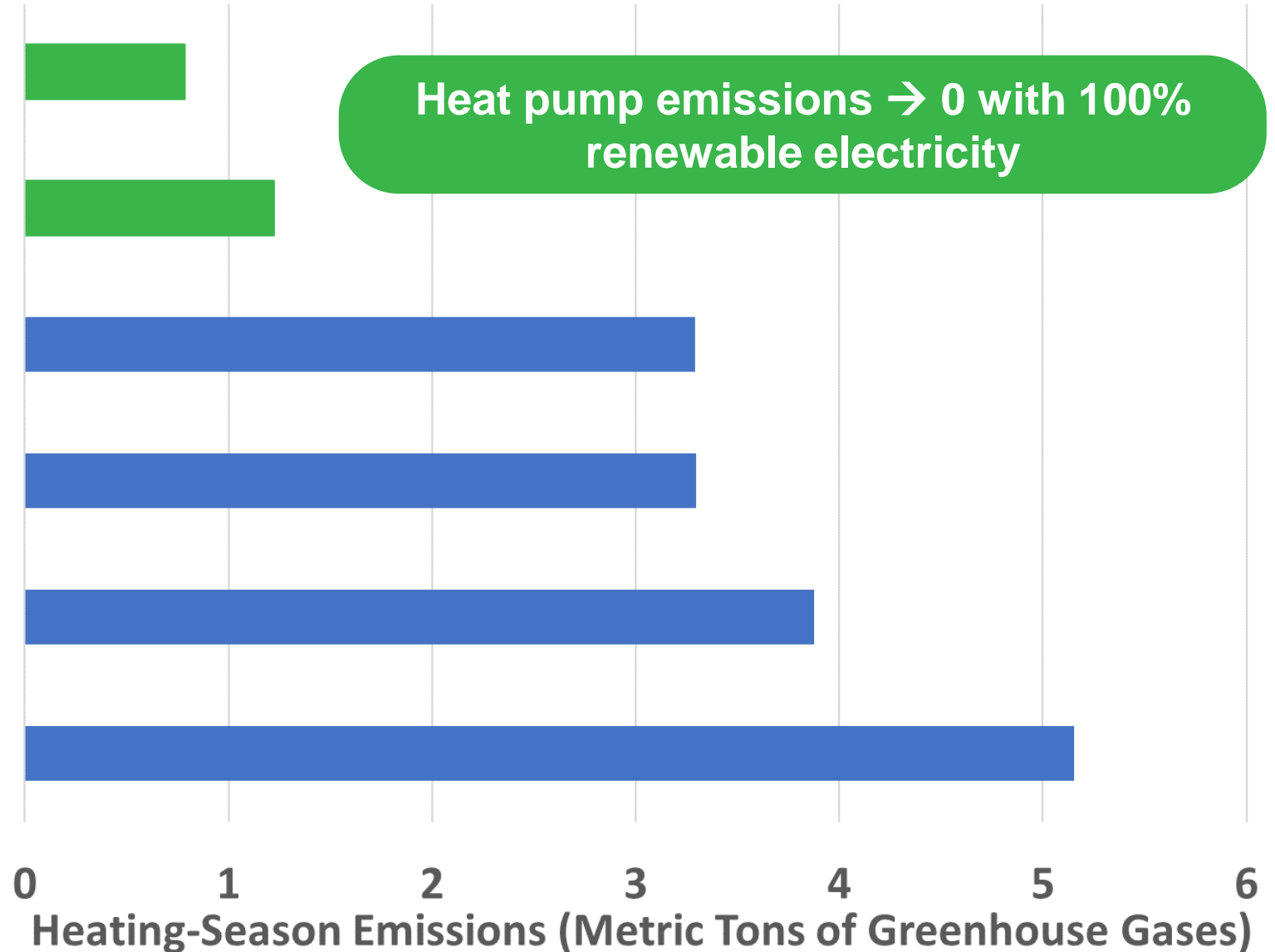
Air-Source
HP

Natural Gas

Baseboard
Electric

Propane

Fuel Oil



Notes:

- Based on projected grid emissions (2022 – 2040) for New England
- High-efficiency, new equipment
- Metric Ton = 2,205 lb.

Which Type of Heat Pump is Right for Your Home?

Every Home is Unique

What is Your Existing Heat Distribution Type?

Hydronic (Hot Water or Steam)



Boiler



Baseboards



Steam Radiators

Also, Radiant Floors

or

Forced-Air



Furnace



Supply and Return Vents,
floor- or wall-mounted

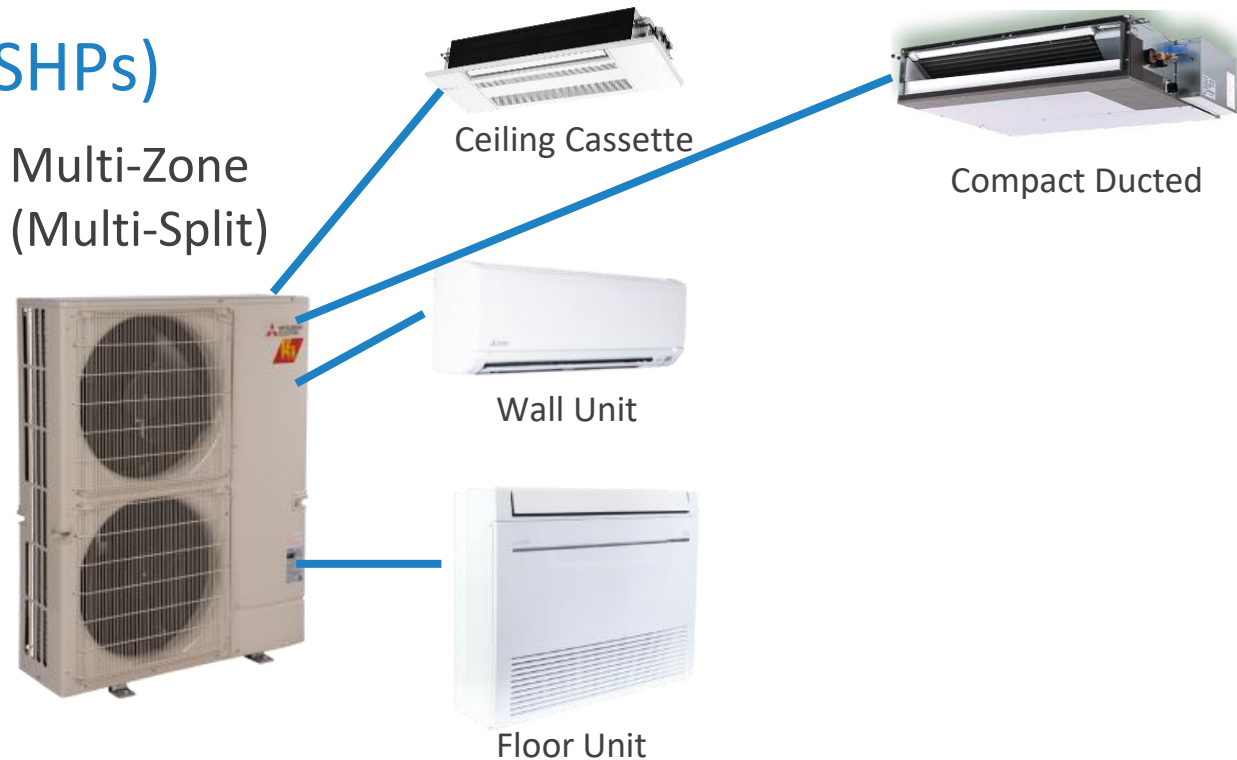
Heat-pump options for hydronic distribution

Ductless “mini-split”
air-source heat pumps (ASHPs)

Single-Zone
(Mini-Split)



Multi-Zone
(Multi-Split)



**Your fossil-fuel system can provide
backup in extreme conditions**

*Most photos courtesy of NEEP.
No brand endorsement intended.*

Heat-pump options for forced-air distribution

Central air-source heat pump (ASHP)

Partial
electrification
option



Indoor Furnace and Coil



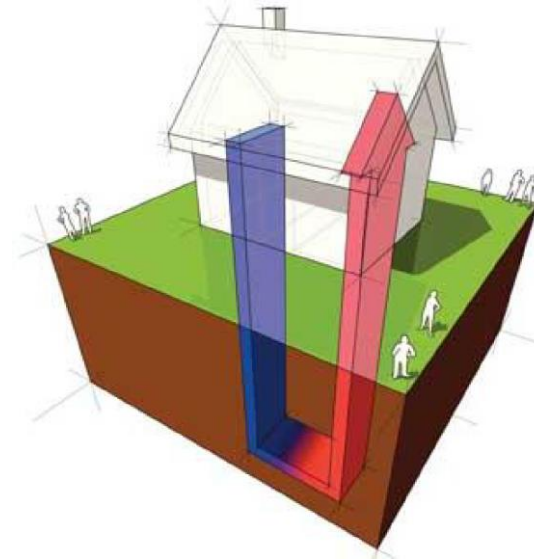
Outdoor Unit
- looks like central AC

Complete
electrification
option



Indoor Air Handler

Ground-source heat pump (GSHP)



or

Complete
electrification



**Existing ducting must be suitable:
insulated, sealed and properly sized**

Ground-Source vs. Air-Source Heat Pumps

Ground-Source

- Larger incentives
- 50% - 70% higher efficiency
 - *Lower energy costs*
 - *Lower emissions*
- Better outdoor aesthetics—nothing above ground
- Factory-packaged heat pump (less risk of refrigerant leaks)



Air-Source

- Lower first cost
- No disturbance of landscaping
- Requires small outdoor space
- More ductless options (currently)



Heat-pump option for domestic hot water

Heat-Pump (*aka* Hybrid) Water Heaters

- Over 60% savings on energy / carbon emissions
- Fast payback compared to conventional electric
- Installed by plumbers and HVAC installers

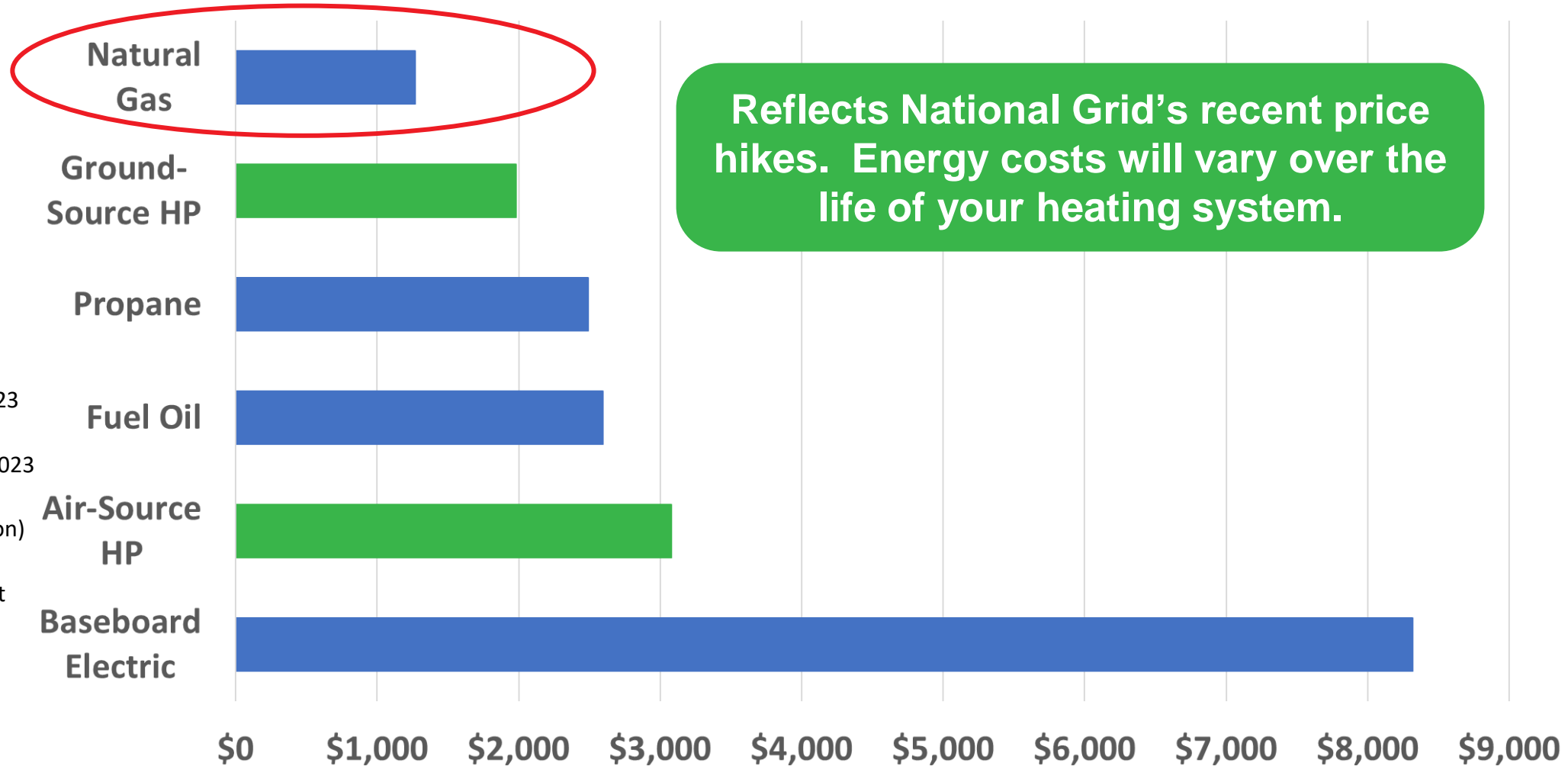


*Photos courtesy of manufacturers.
No brand endorsement intended.*

How Much Will It Cost?

Chelmsford Heating Costs for 2022/23 Season

2,000 sf home
Typical construction



Notes:

- National Grid electricity cost (\$0.48/kWh) 11/2022 – 04/2023
- National Grid gas cost (\$2.04/therm) 11/2022 – 04/2023
- 2022/2023 MA-average winter costs for oil (\$5.12/gallon) & propane (\$3.65/gallon)
- High-efficiency new equipment

Financial Incentives



2023 Mass Save Residential*

- \$15,000 for whole-home GSHP
- \$2,000/ton for partial-home GSHP
- \$10,000 for whole-home ASHP
- \$1,250/ton for partial-home ASHP
- \$750 for HPWH (paid to distributor)
- \$25,000 HEAT loan, 0% for 7 years
 - Includes electrical-panel upgrades
- Additional income-eligible benefits

Federal Inflation Reduction Act**

- Federal Tax Credits
 - 30% on GSHP
 - Up to \$2,000 for ASHP
 - Up to \$2,000 for HP Water Heater
- Income-Based Rebates *mid/late 2023?*
 - \$0 - \$8,000 for ASHP
 - \$0 - \$1,750 for HP Water Heater
- *And much more ...*

* <https://www.masssave.com/en/saving/residential-rebates>

** <https://www.rewiringamerica.org/app/ira-calculator>

Financial Analysis

- Look at first-cost ***difference***
 - heat pump vs. conventional equipment
 - ✓ Include ***both*** heating ***and*** cooling equipment
- Include incentives (rebates, loans, tax credits)
- Consider
 - ✓ Assigning a price to carbon emissions
 - ✓ Possible increase in home resale value
 - ✓ Value of comfort improvements
- Accept uncertainties about future energy costs

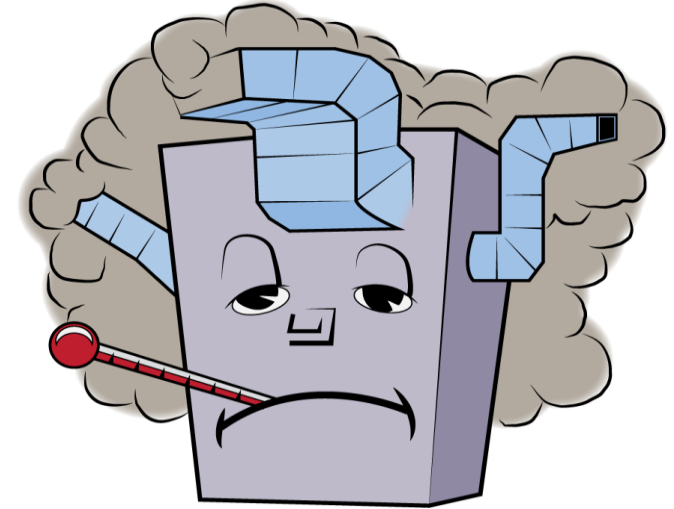


Your Action Plan

Convert to a heat pump when ...

Plan Ahead! Don't wait for failure when replacement becomes urgent

1. Existing equipment is aging
 - *Heating OR cooling equipment over 15 years old*
 - *Water heater over 7 – 10 years old*
2. Adding AC to a home that doesn't have it yet
 - *Heat pumps provide efficient heating and cooling*
3. Planning an addition, renovation, or a new home
 - *Heat pumps can meet 100% of heating/cooling needs*



How do I get started?

1. Get informed

- *Visit heatsmartalliance.org/resources/*

2. Get a free Mass Save home energy assessment

- *Weatherize to the extent practical*

3. Get advice from a heat pump advocate or coach

4. Get quotes from heating/cooling installers

- *Every home is unique – you'll learn from each installer*
- *Consider all factors (equipment offered, installer reputation, and cost)*



Thanks for Listening!