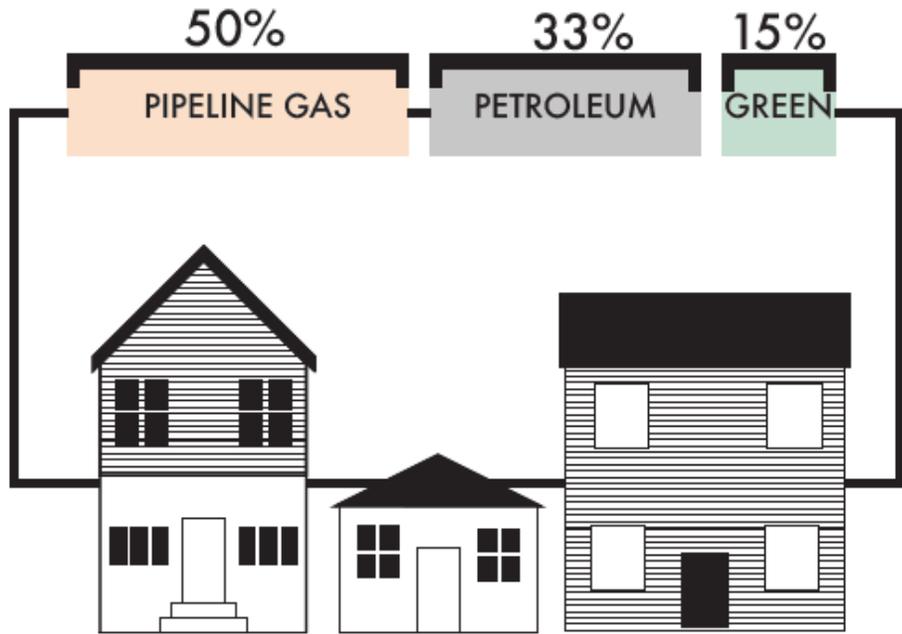


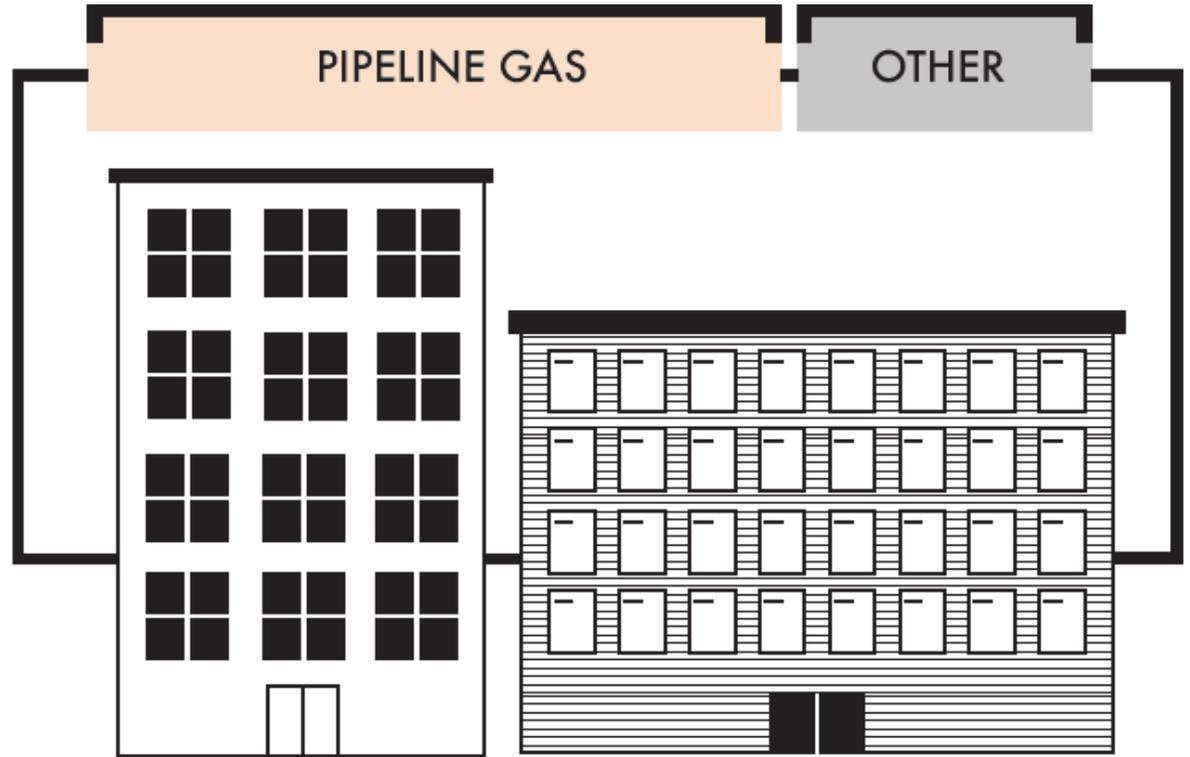
South Deerfield Network Geothermal Feasibility Study

HEET KICKSTART MASS GRANT

MAY 2024 – July 2025



Type of heat used in residential buildings



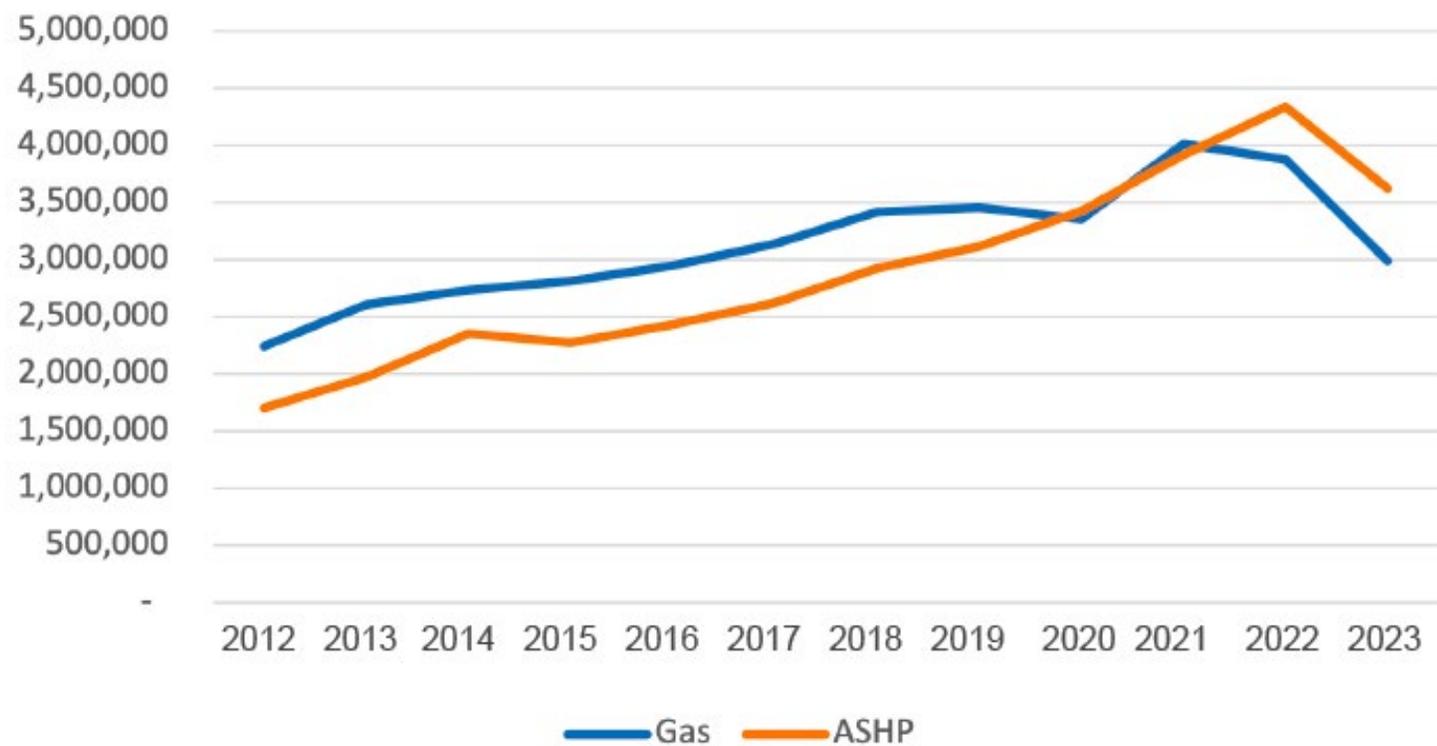
Type of heat used in commercial buildings

Energy in Buildings

Image Credit: Studio 605: Energy Transition Landscapes: Deerfield, Professor Carolina Aragon

UMass Amherst Landscape Architecture & Regional Planning Fall 2024

Heat pump sales in U.S. compared to gas furnaces, 2012-2023

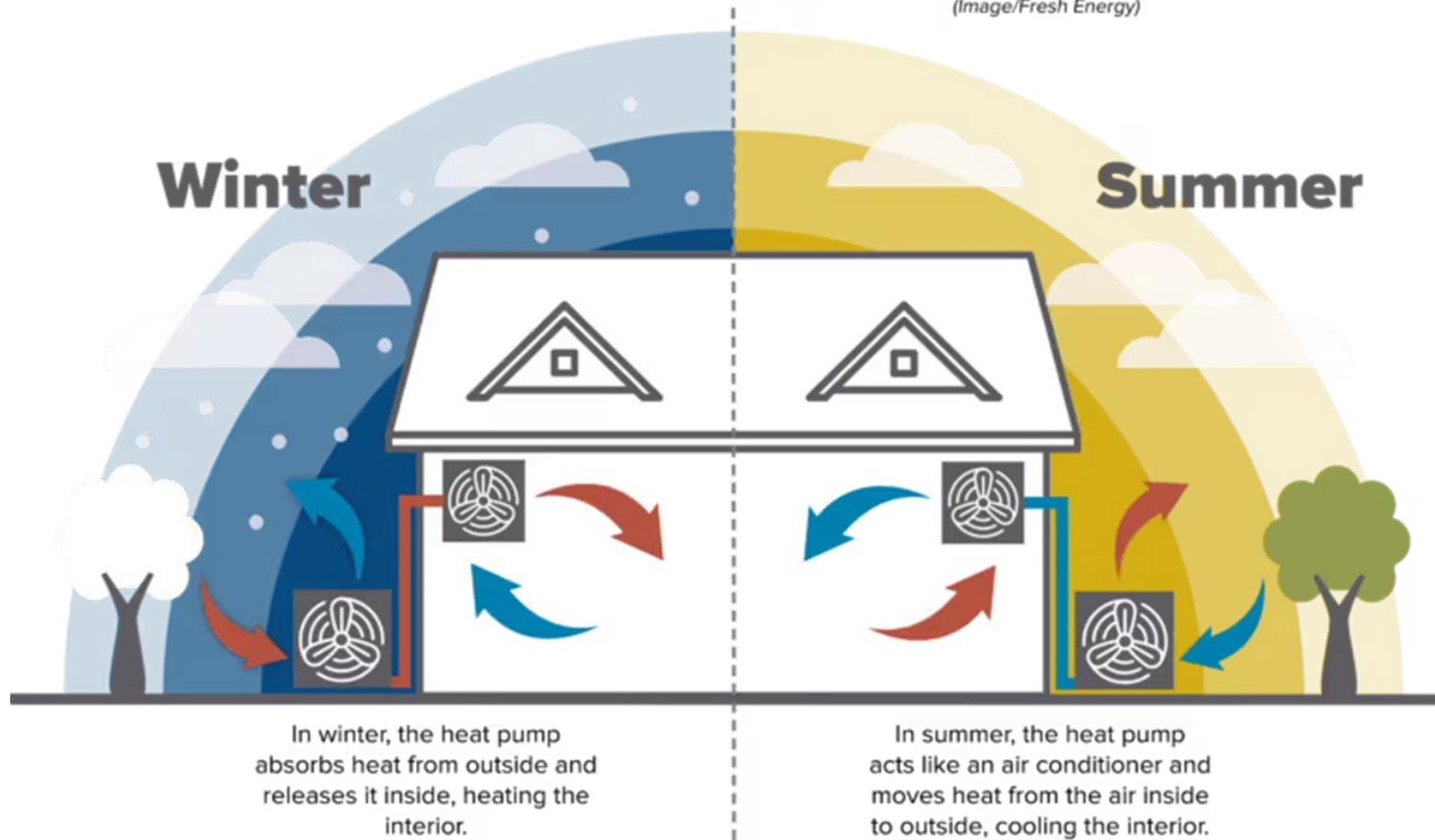


Source: Air-Conditioning, Heating, and Refrigeration Institute

Electrification

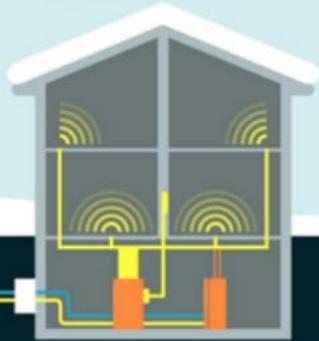
Air-Source Heat Pumps

(Image/Fresh Energy)



Geothermal heating

Warm air circulates through the home

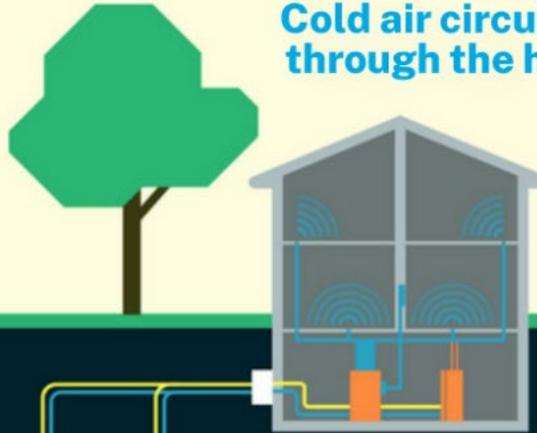


Heat is absorbed from the ground

55°

Geothermal cooling

Cold air circulates through the home

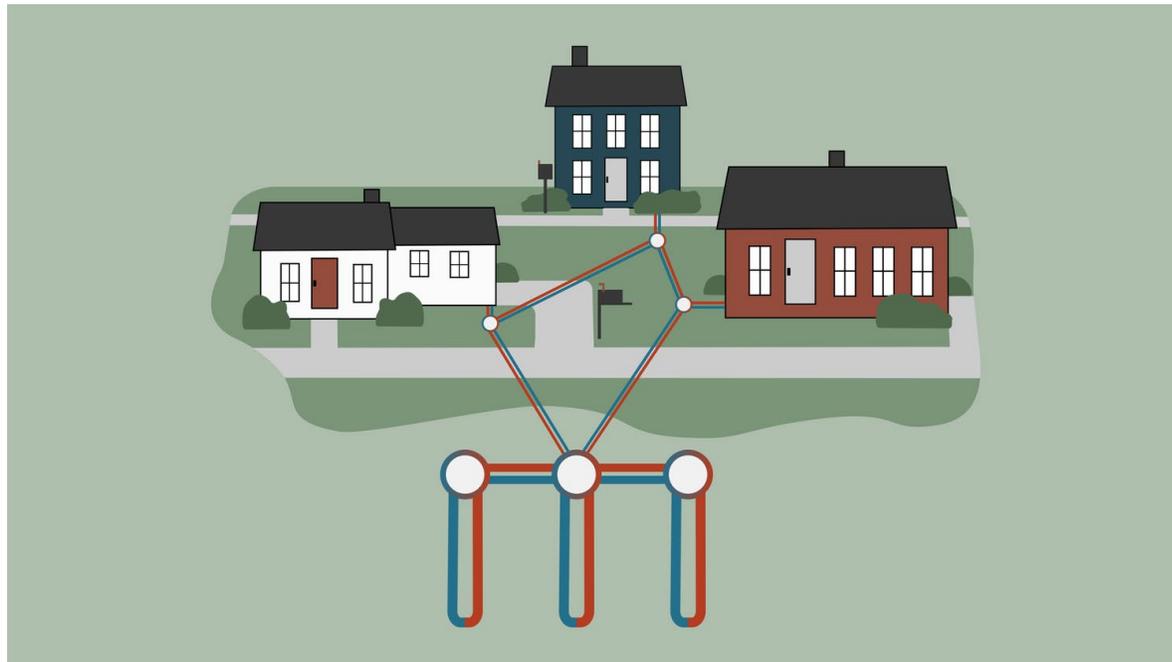


Heat is dispersed into the ground

Ground Source Heat Pump aka Geothermal

This Old House - Geothermal

<https://youtu.be/IMO9jvwlHFg>



Networked Geothermal

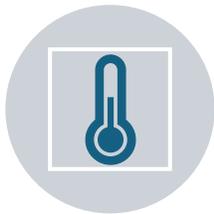
Benefits of Geothermal



COST
STABILITY



LIFESPAN



CLIMATE
IMPACT



COMFORT AND
RELIABILITY

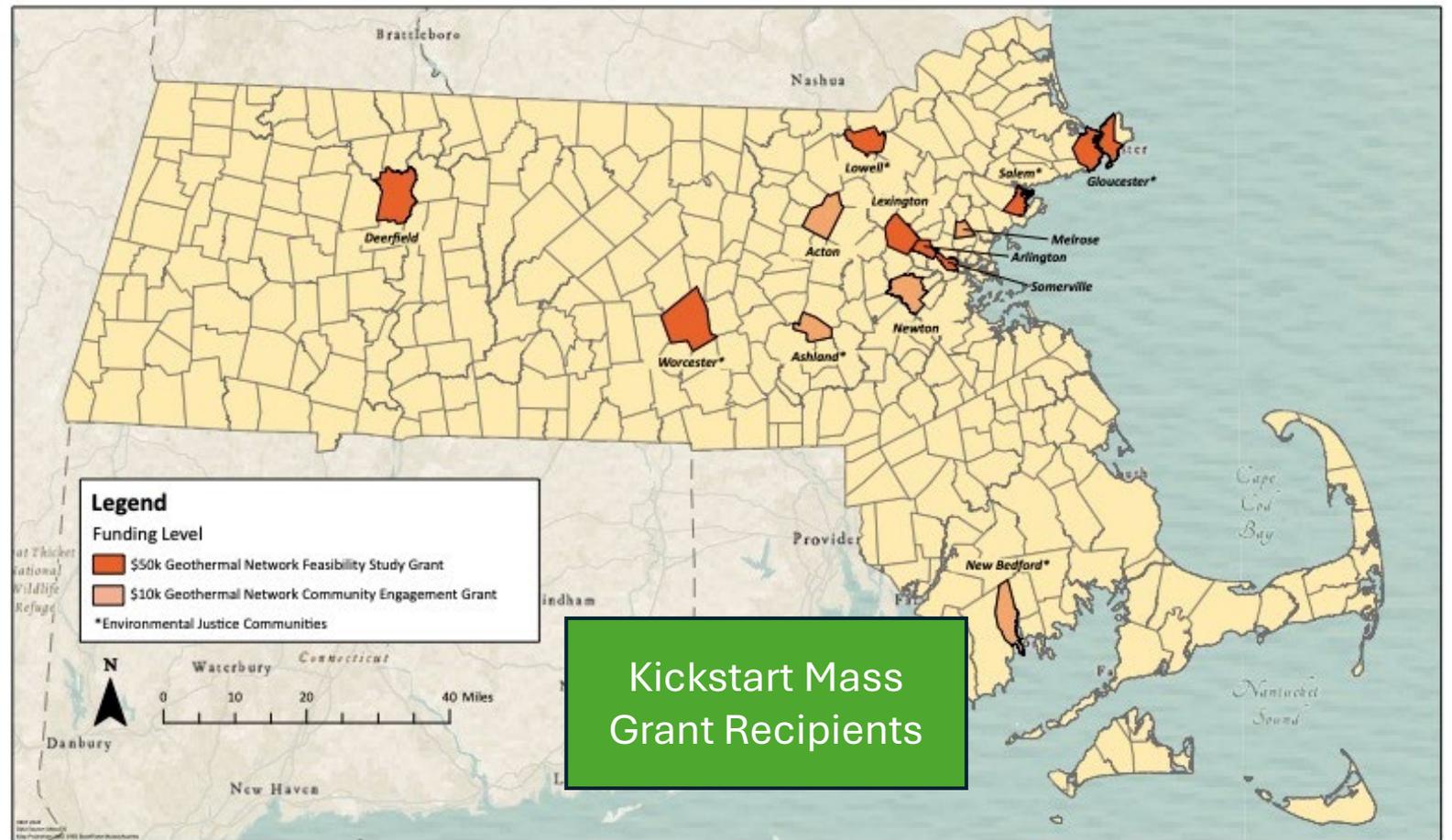


Networked Geothermal

- Waste heat
- Use existing business model
- Employees credential

HEET Kickstart Mass Grant

- \$50,000 grant provided by the Home Energy Efficiency Team (HEET) a nonprofit
- 1 of 14 communities selected
- Focused on creating a pipeline of shovel-ready Gas to Geo projects



Iteration 3

Tree House Brewing Company

Pelican Plastics

Iteration 2

Frontier Regional

S Deerfield Fire/SCEMS

Iteration 1

Deerfield Elementary

Municipal Campus

Berkshire Brewing Company

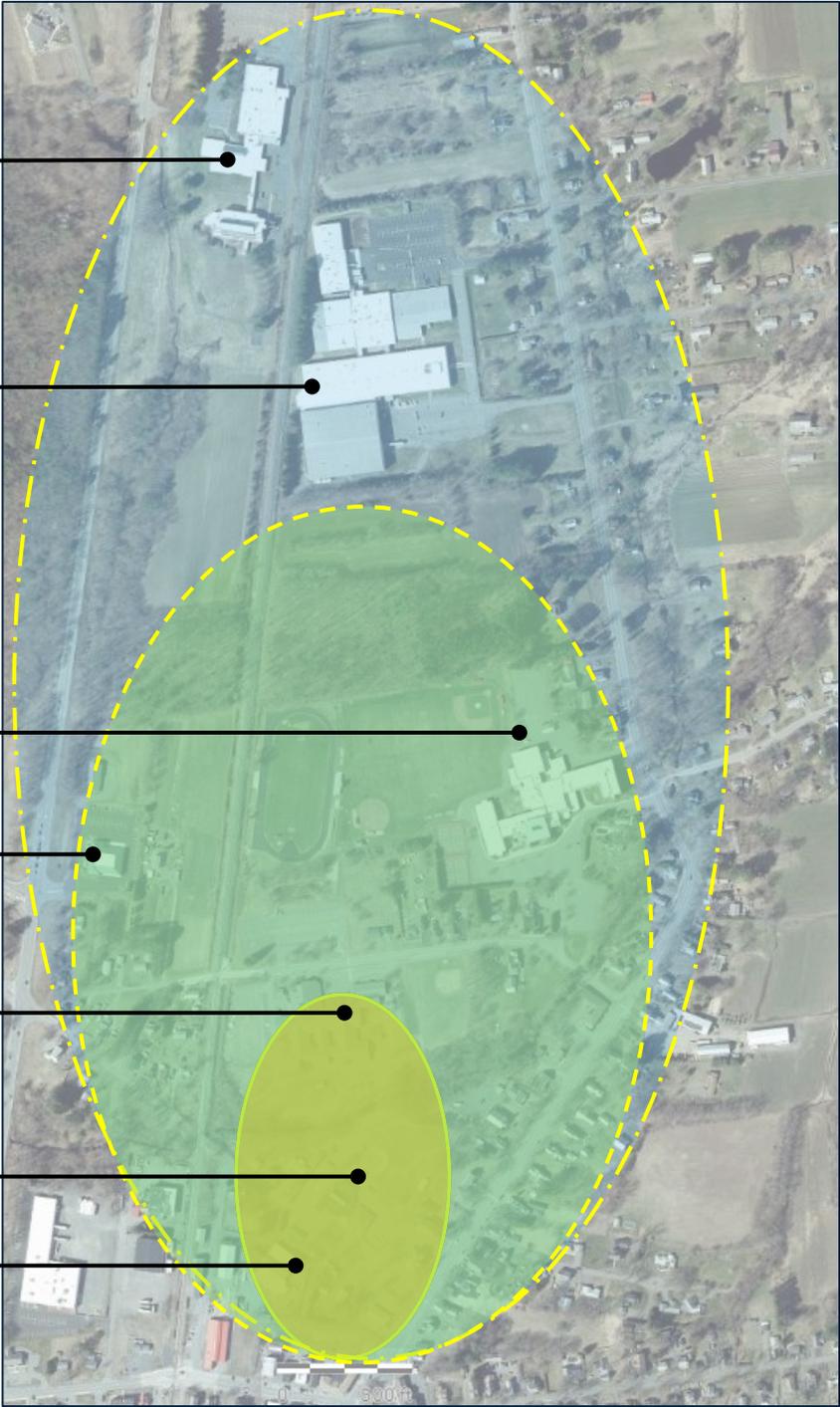


Table 5-2. Estimated order of magnitude capital costs

	Modelled Capital Cost (\$)		
Variable Cost (\$/ft)	Iteration 1	Iteration 2	Iteration 3
40	\$11,003,746	\$ 19,072,143	\$ 24,505,643
60	\$11,797,246	\$ 20,567,143	\$ 26,000,643
80	\$12,590,746	\$ 22,062,143	\$ 27,495,643

Networked Geothermal Routing Options

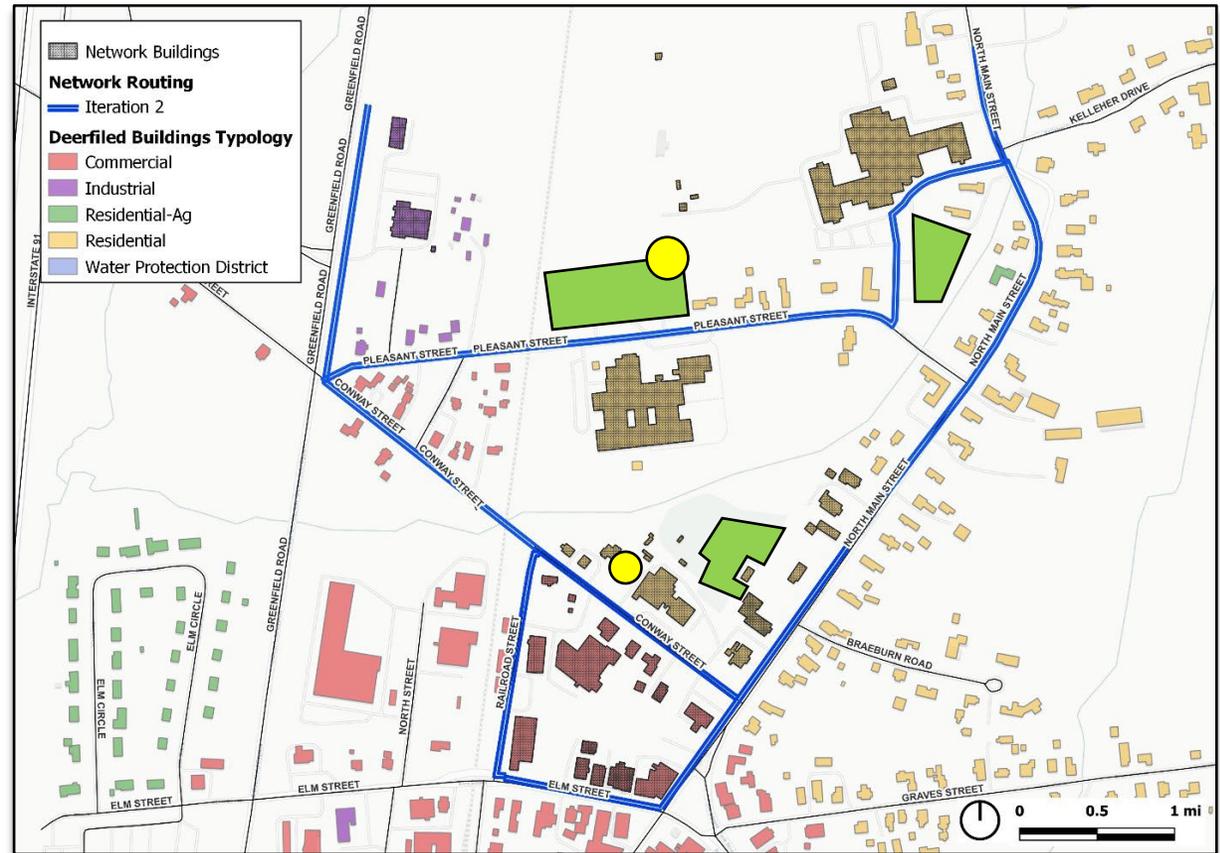
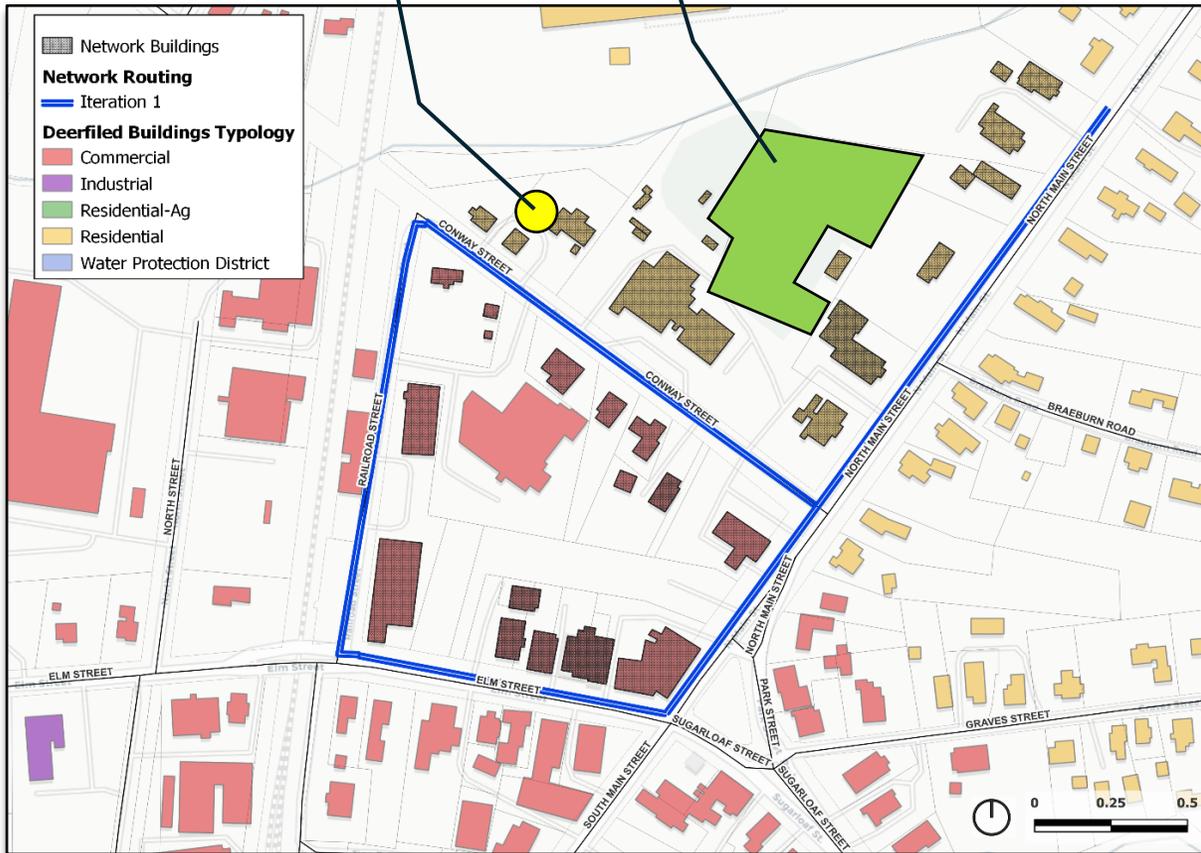
Iteration 1 & 2

Potential Pump House Location

Geothermal Borefield

Iteration 1

Iteration 2



Conclusions

1. despite technical feasibility, the current iterations are cost prohibitive and non-competitive with other alternatives (individual geothermal systems or air-sourced heat pumps)
2. For a network geothermal system to operate economically and technologically successfully, all of the single-family homes would need to be connected to the system within the town under iteration 1 or 2 PLUS another 200 residents in the planned cultural living center (CLC) and assisted living facility.
3. Connecting a network system as postulated in iteration 3 would cause captured heat from Tree House Brewing and Pelican Products to be lost to the ground in an ambient temperature loop. Additionally, if the pipes were insulated, the cost would just be amplified without sufficient return on investment.
4. Geothermal is still a viable investment under the current federal administration.
5. Utilizing State and Federal incentives, individual geothermal systems are most likely still viable opportunities
6. The transition off fossil fuel heating will increase electrical demand on the grid, so a combined system utilizing solar, battery and either ASHP or Geothermal needs to be investigated on a case-by-base basis to make sure the solution is not just environmentally sound, but economically viable for each individual case.

Questions and Answers

Please feel free to raise your hand.



Think of a question after? Please feel free to call, email, or stop in Town Hall

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