CleanEnergy States Alliance

Geothermal Networks: An Opportunity for States

August 11, 2025

Webinar Logistics

All attendees are in **“listen only” mode** – your webcam and microphone are disabled.
The Chat function is also disabled for attendees.

Submit questions and comments via the Q&A panel 

Automated **captions** are available 

Speakers' bios will be made available in the chat

This webinar is being recorded. We will email you a webinar recording within 48 hours. This webinar will be posted on CESA’s website at **www.cesa.org/webinars**

Celebrating 20 Years of State Leadership

Clean Energy States Alliance

The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy.

CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

www.cesa.org

CleanEnergy States Alliance

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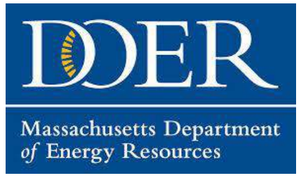
NORTH CAROLINA
DEPARTMENT of
COMMERCE



Webinar Speakers

Zeyneb Magavi
HEET

Nikki Bruno
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Peter McPhee
Mass. Clean Energy Center

Warren Leon
Clean Energy States Alliance

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EVERSOURCE

MASSACHUSETTS CLEAN ENERGY CENTER

CleanEnergy States Alliance

Thank You

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Upcoming Webinars

Assessing Hydrogen for Long Duration Energy Storage: Use Cases, Costs, and Affordability Concerns (August 13)

Supporting States and Communities: NREL's Workforce Development Tools and Technical Assistance (September 9)

Solar+Storage for Community Health Centers: CrescentCare Case Study (September 11)

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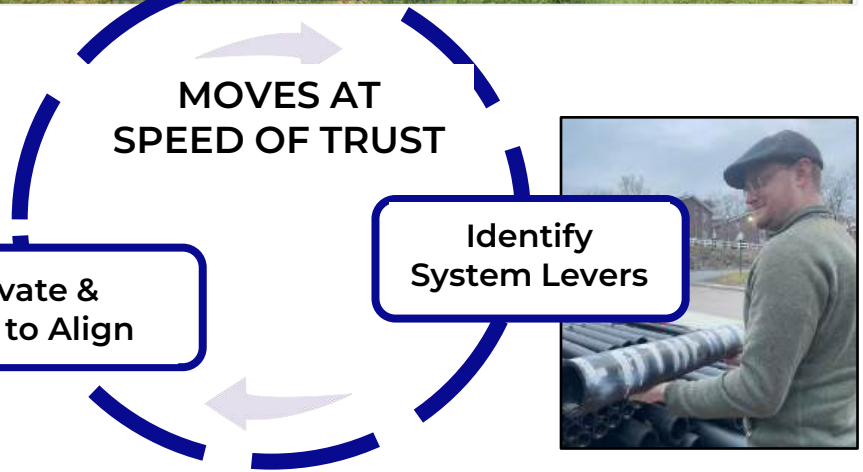
Tapping the Thermal Energy Opportunity with Geothermal Networks

CESA Webinar, July

Zeyneb Magavi, HEET

APPROACH to SYSTEM CHANGE



SYSTEM NEEDS ?

- ☐ High Safety & Security
- ☐ Emissions Free
- ☐ Reliable & Resilient
- ☐ Scalable & Adaptable
- ☐ Workforce Transition
- ☐ Ethical Distribution
- ☐ Affordable for consumer
- ☐ Economic & Market Compatible
- ☐ Speed & Scale needed

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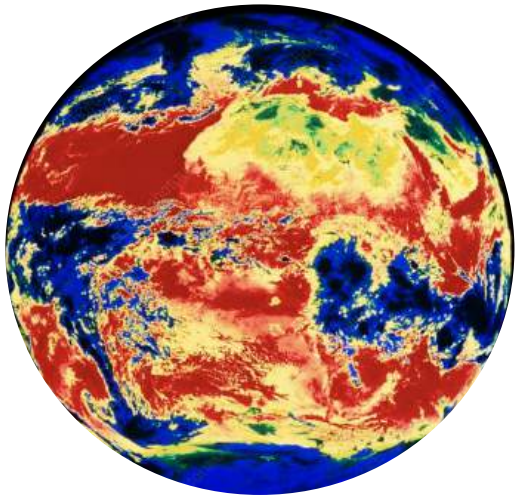
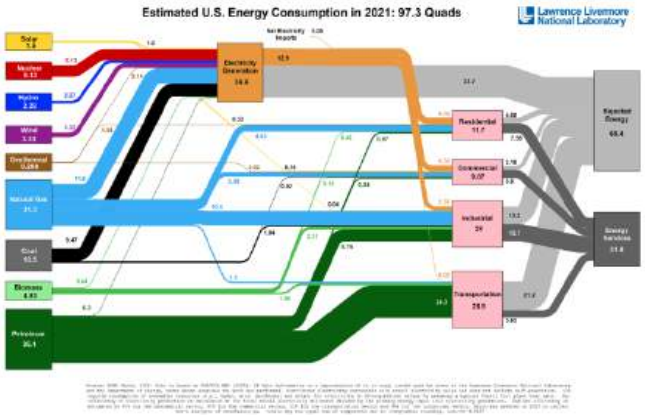


“The technical potential of geothermal would be more than enough to meet all heat demand in Africa, China, Europe, Southeast Asia, and the United States.”

IEA 2024



WHY THERMAL ?

Climate change is increasing Earth’s surface thermal energy at an annual rate of more than 10 times the energy all of humanity uses in a year.

We can tap and move that geothermal energy, restoring thermal equilibrium.

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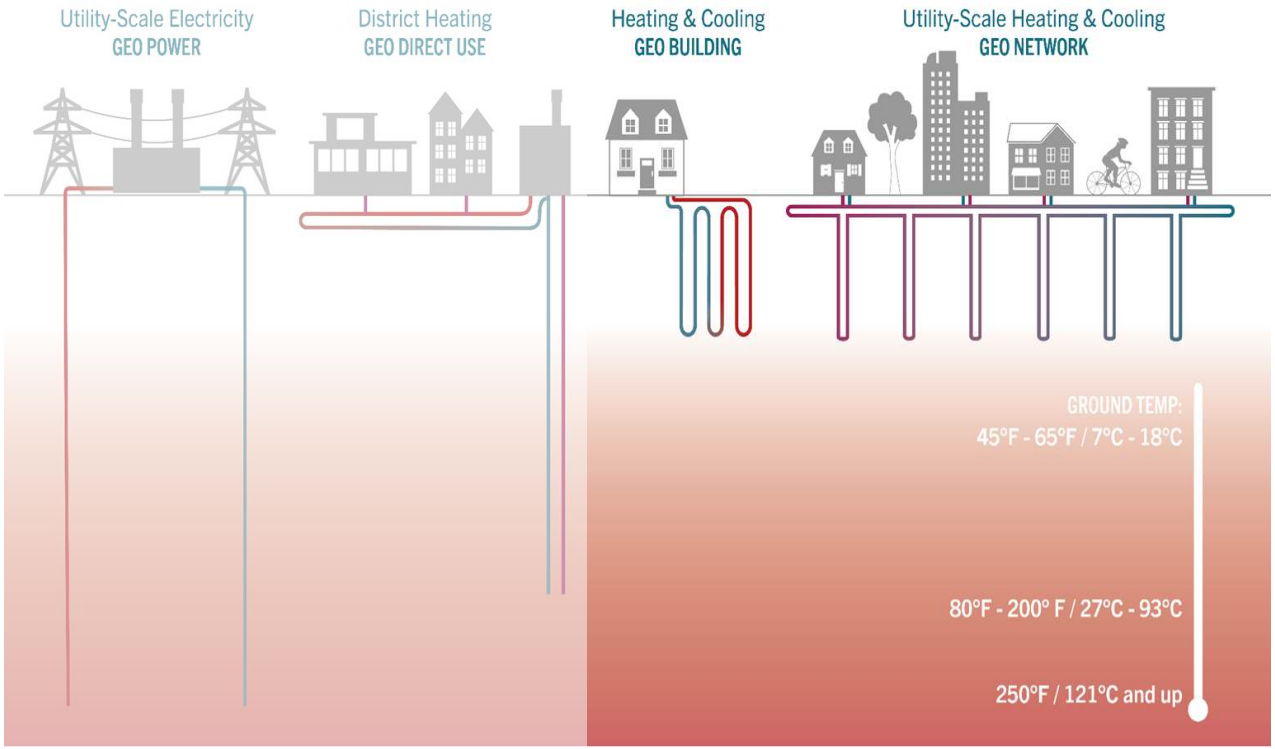

WHAT IS GEOTHERMAL ?

All Geothermal Technologies provide STABLE ‘rock-solid’ non-intermittent energy.

Ambient ‘surface’ geothermal technologies can provide energy everywhere for heating and cooling with zero emissions.

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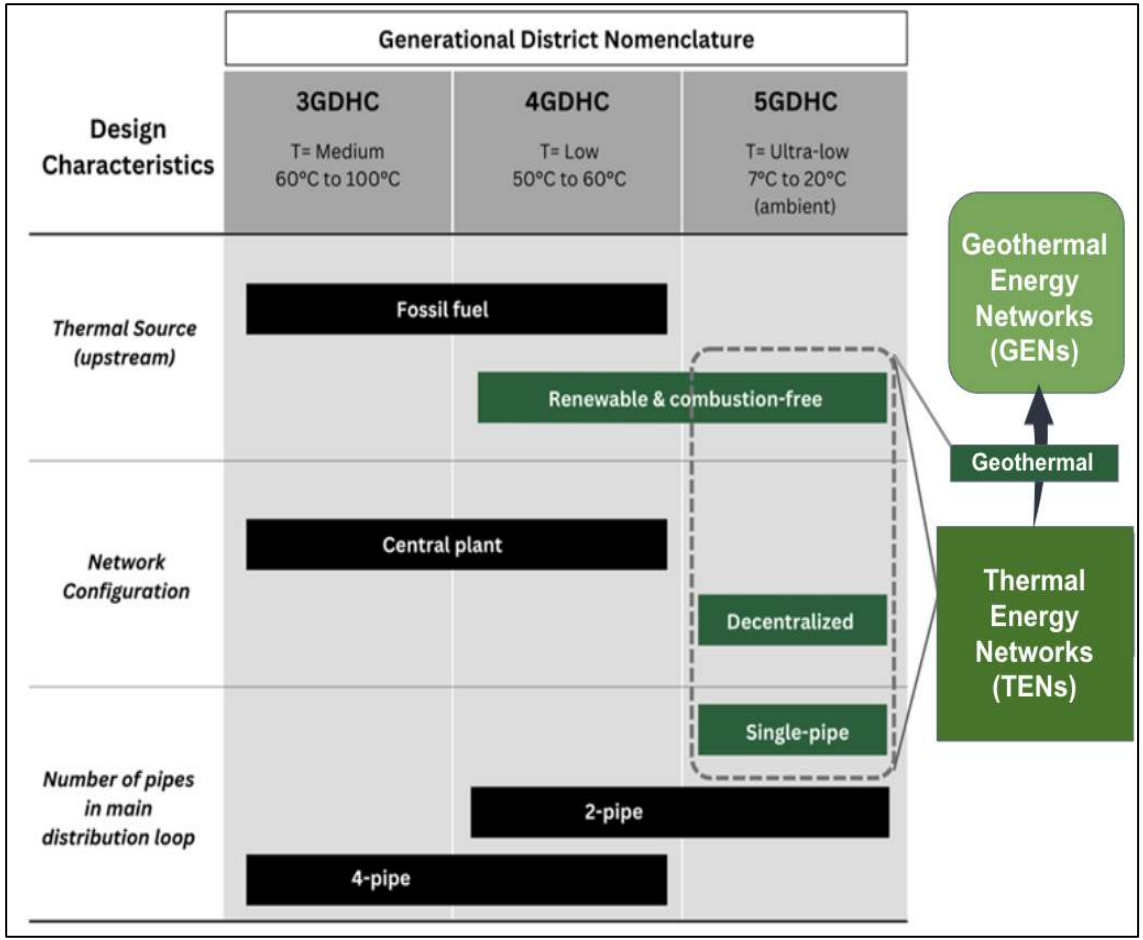

WHY NETWORK ?

District energy is an ancient technology that has evolved over time. The most recent evolution, from 4th to 5th generation is a significant one. The shift to a single-pipe further unlocks the growth model through a network effect, hence the name.

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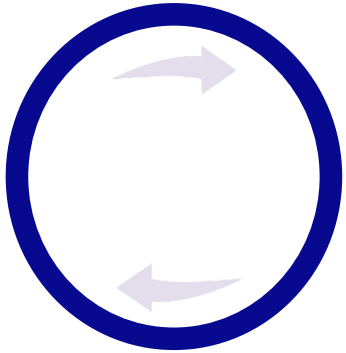
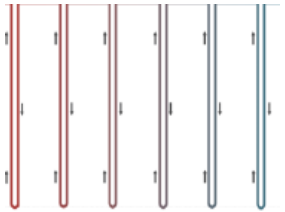
BUILDINGS :
(GEOTHERMAL HEAT PUMP)



DISTRIBUTION LOOPS:
(THERMAL ENERGY NETWORK)



THERMAL RESOURCES:
(GEOTHERMAL BOREHOLES)

Also . . .
WASTEWATER EXCHANGE
INDUSTRIAL WASTE HEAT
LAKES, RIVERS, PONDS
OTHER THERMAL . . .

WHAT IS A GEOTHERMAL NETWORK ?

Every component of a Geothermal Energy Network contributes efficiencies. Together they are the most efficient heating and cooling.

Each component is OLD TECH.

Together they are NEW TECH

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MODULAR GROWTH

A single-pipe ambient temperature design as ‘common carrier’ allows modular and flexible growth of a regional thermal utility. Creating a thermal market.

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WORKFORCE

The majority of geo jobs in Framingham were performed by gas workforce. Gas workforce unions are ready to build geo.

With the exception of the geothermal drilling sector which needs immediate workforce development now. HEET led a first-in-nation geothermal drilling technician tutorial with 80-hr classroom & field curriculum.

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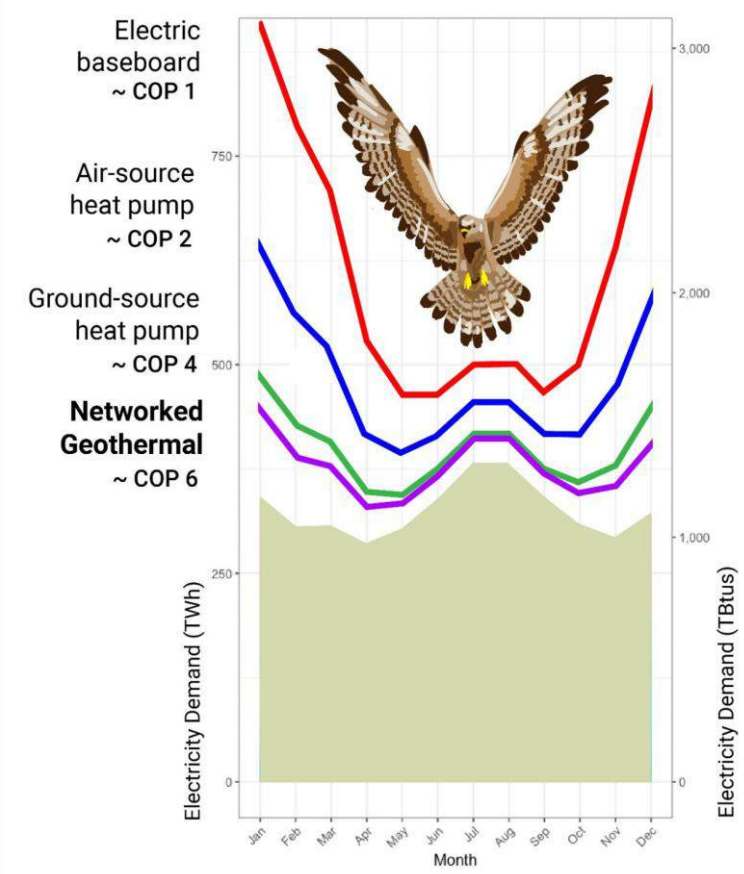

ELECTRIC GRID

The efficiency of the building technology directly impacts the electric grid, determining electric affordability and decarbonization feasibility. The cost savings moving from Air-Source to Ground Source in the U.S. will exceed 1.5 Trillion by 2050.

Buonocore, J. J., Salimifard, P., Magavi, Z., & Allen, J. G. (2022). Inefficient Building Electrification Will Require Massive Buildout of Renewable Energy and Seasonal Energy Storage. *Scientific Reports*, *12*(1), 11931–11931. https://doi.org/10.1038/s41598-022-15628-2

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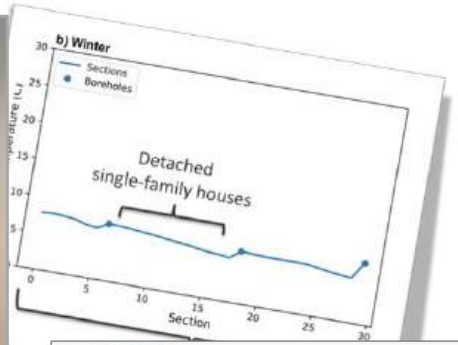
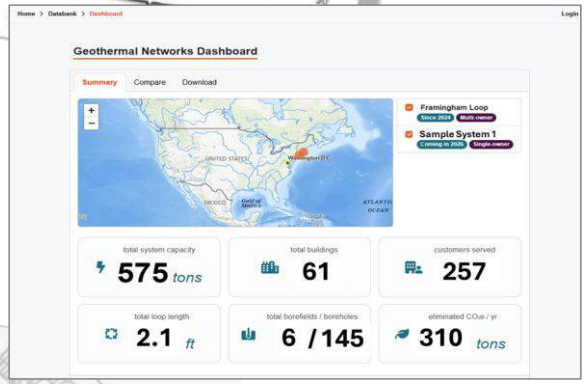
The LeGUp Research Team





University of Massachusetts Lowell

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

MassDEP
Department of Environmental Protection

BERKELEY LAB

SOGA RESEARCH GROUP
BERKELEY ENGINEERING

MIT MANAGEMENT
SLOAN SCHOOL

BURO HAPPOLD

BOSTON UNIVERSITY
SCHOOL of Public Health

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DEMONSTRATED

- ☑ High Safety & Security
- ☑ Emissions Free
- ☑ Reliable & Resilient
- ☑ Scalable & Adaptable
- ☑ Workforce Transition
- ☑ Ethical Distribution
- ☑ Affordable for consumer
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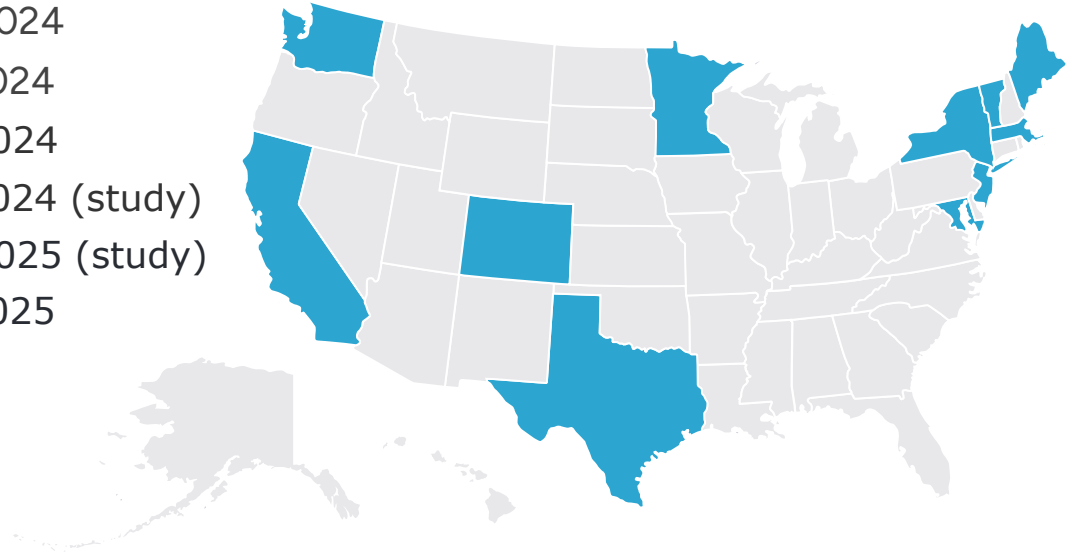
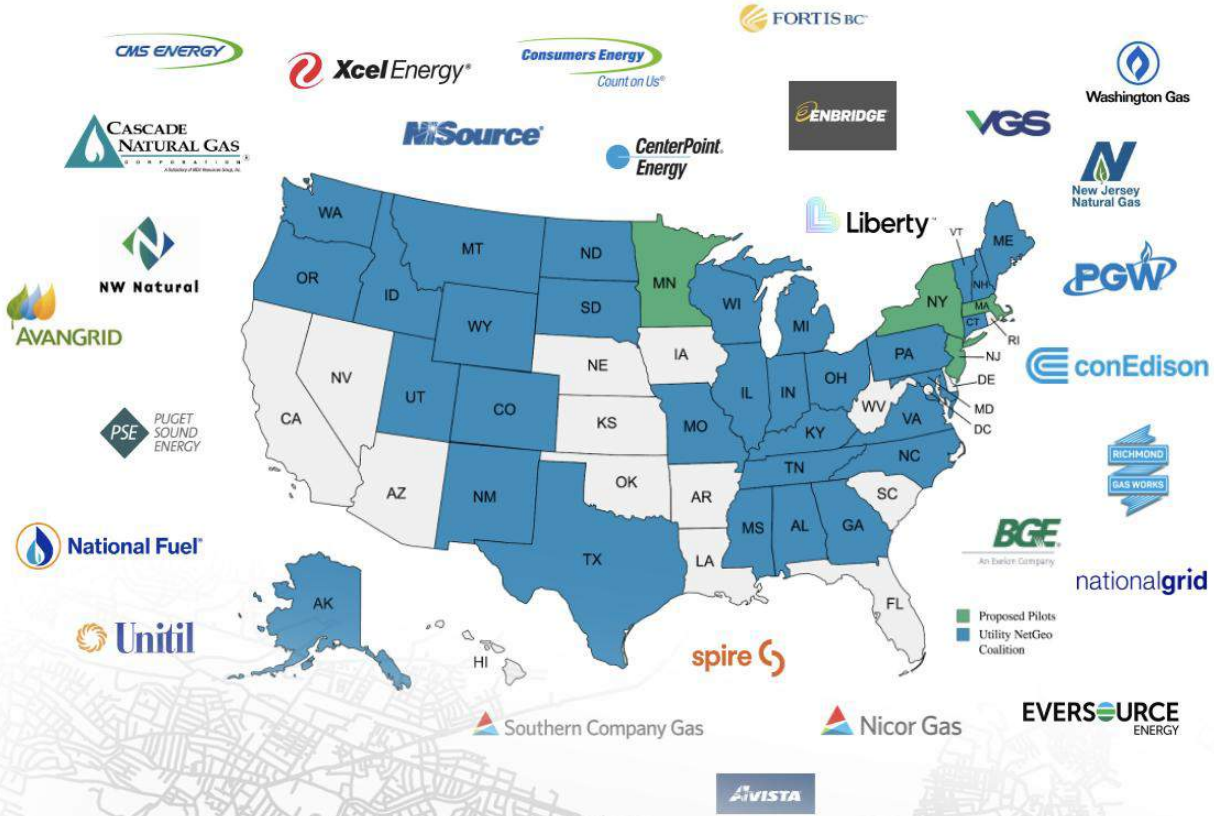
MA - 2021, 2022, 2024, **2025**
MN - 2021, 2024, **2025**
NY - 2022, **2025**
CO - 2023, 2024
WA - 2024, 2025
MD - 2024
VT - 2024
CA - 2024
NJ - 2024 (study)
ME - 2025 (study)
TX - 2025



LEGISLATION

The alignment across stakeholders and excitement of the thermal opportunity has led to growing momentum across the country. Pictured are the states that have passed legislation. Many more are currently considering.

BDC heet



GAS UTILITY ?

The technology can be built and owned by any entity. So why do we particularly focus on gas utilities? Because it provides the workforce transition, the financing mechanism, and a stabilization of rate affordability for gas customers.

Pictured:

Utility Networked Geothermal Coalition (UNGC)

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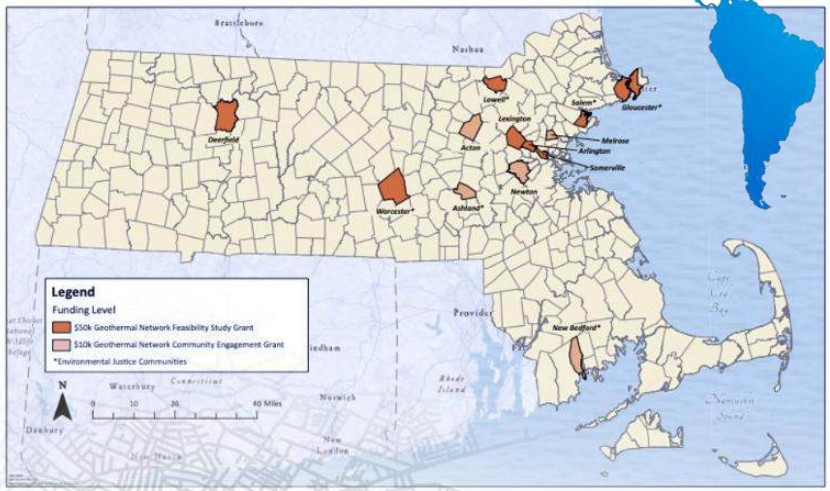

PROJECT PIPELINE

This small shift from individual geothermal heat pump to networked geothermal utility has rapidly unlocked a groundswell of projects, from local to global - pictured are just the ones HEET is involved in at the moment.

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#ThinkThermal

Want Geo Service?

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Geothermal Networks – An Opportunity for States

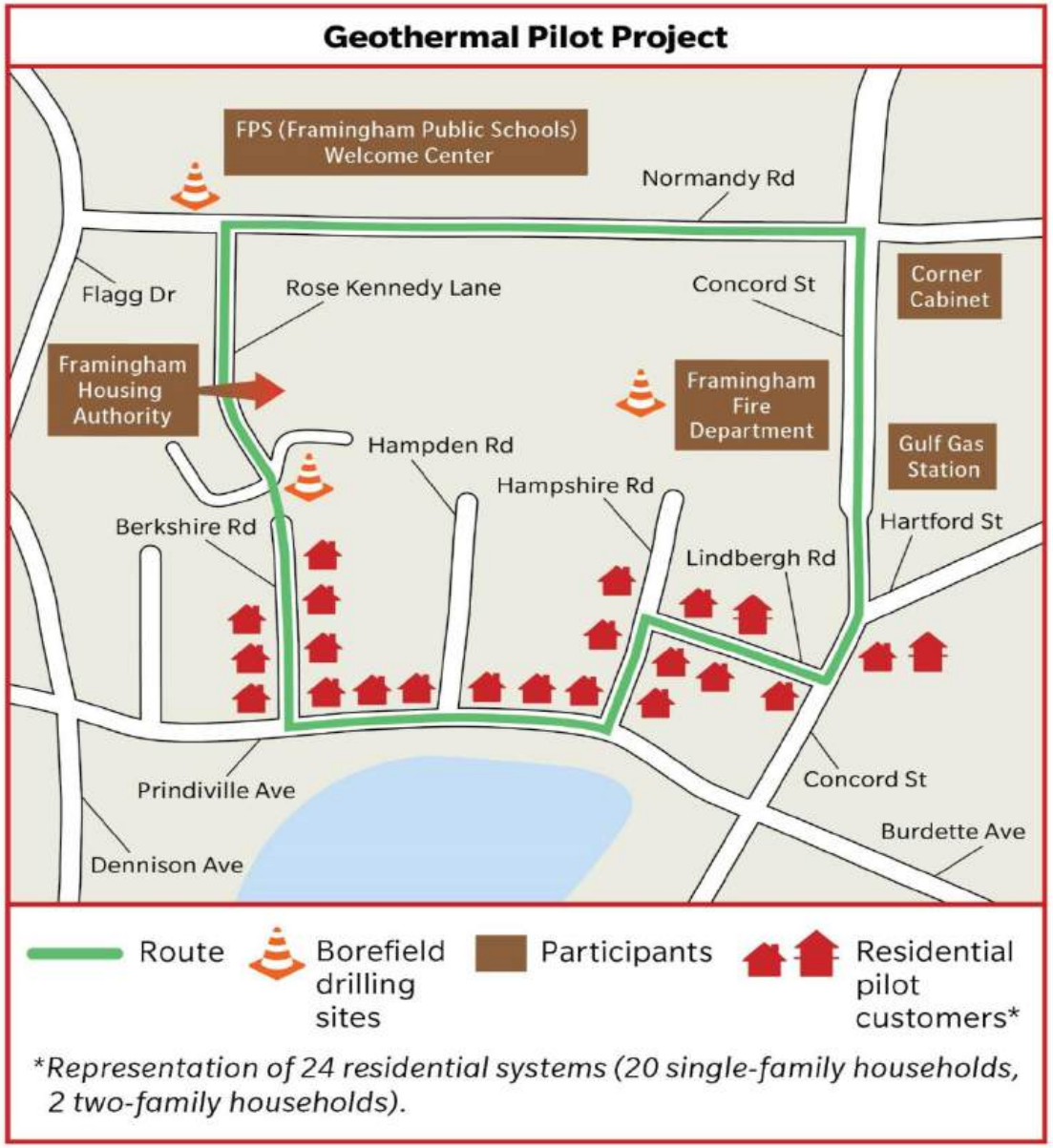
Nikki Bruno

Eversource Energy

August 11, 2025

Pilot Overview

- 140 customers across 36 buildings
- Single pipe system of approximately 1 mile of main throughout a neighborhood in Framingham, MA
- 40 buildings with 140 individual customers throughout
- 90 boreholes to provide capacity of approximately 375 tons of load




OVERSIZE LOAD


FRAMINGHAM FIRE DEPARTMENT

EVERSOURCE