

Geothermal Retrofits: Planning, Myths, and the Long-Term Business Case

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AN EXISTING-BUILDING PROBLEM

80%

of buildings that will
exist in 2050 are already built

Most of these buildings are already standing

Most still rely on on-site fossil fuel heat

Waiting locks in another equipment cycle

WHY OWNERS SERIOUSLY LOOK AT THIS

01 Failing or end-of-life systems

- A failing boiler forces a decision. That decision shapes the next 20-30 years.

02 Unpredictable operating costs

- Volatile utility costs undermine budgets for churches, municipalities, and institutions.

03 Comfort, resilience, and maintenance

- Comfort complaints, reliability issues, and maintenance burden accumulate.

04 Regulatory and public-pressure drivers

- Building performance standards make the cost of inaction rise each year.

05 Mission and stewardship goals

- For many owners, this is also an expression of values — not just a financial calculation.

FIVE COMMON MYTHS

1 Geothermal is too expensive

2 The ground around here isn't warm enough

3 You need a lot of open land

4 You have to rip out your whole existing heating system

5 The incentives went away

MYTH #1: FIRST COST VS. TOTAL COST OF OWNERSHIP

REALITY: A higher first cost can still produce a better long-term outcome

What geothermal gets judged on

first cost

- X One number
- X Usually high level at feasibility
- X Real comparison involves a 30-year asset

Capital Cost		
	Option 1 – Natural Gas + ASHP	Option 2 - Geothermal
Project Gross Cost	\$ 2,143,963	\$ 4,674,140

WHAT TOTAL COST OF OWNERSHIP REALLY MEANS

Energy costs over time

- Geothermal often uses half the energy of a traditional air source heat pump option.

Capital costs and replacement cycles

- Different technologies have different lifespans and replacement timing.

O&M and major maintenance

- Geothermal systems typically have lower maintenance burden than combustion equipment.

Incentives and tax credit value

- 30%-40% ITC, direct pay for nonprofits, and utility programs affect net cost.

Compliance and penalty exposure

- Building performance standards could make inaction costlier each compliance cycle.

Comfort, resilience, and avoided regret

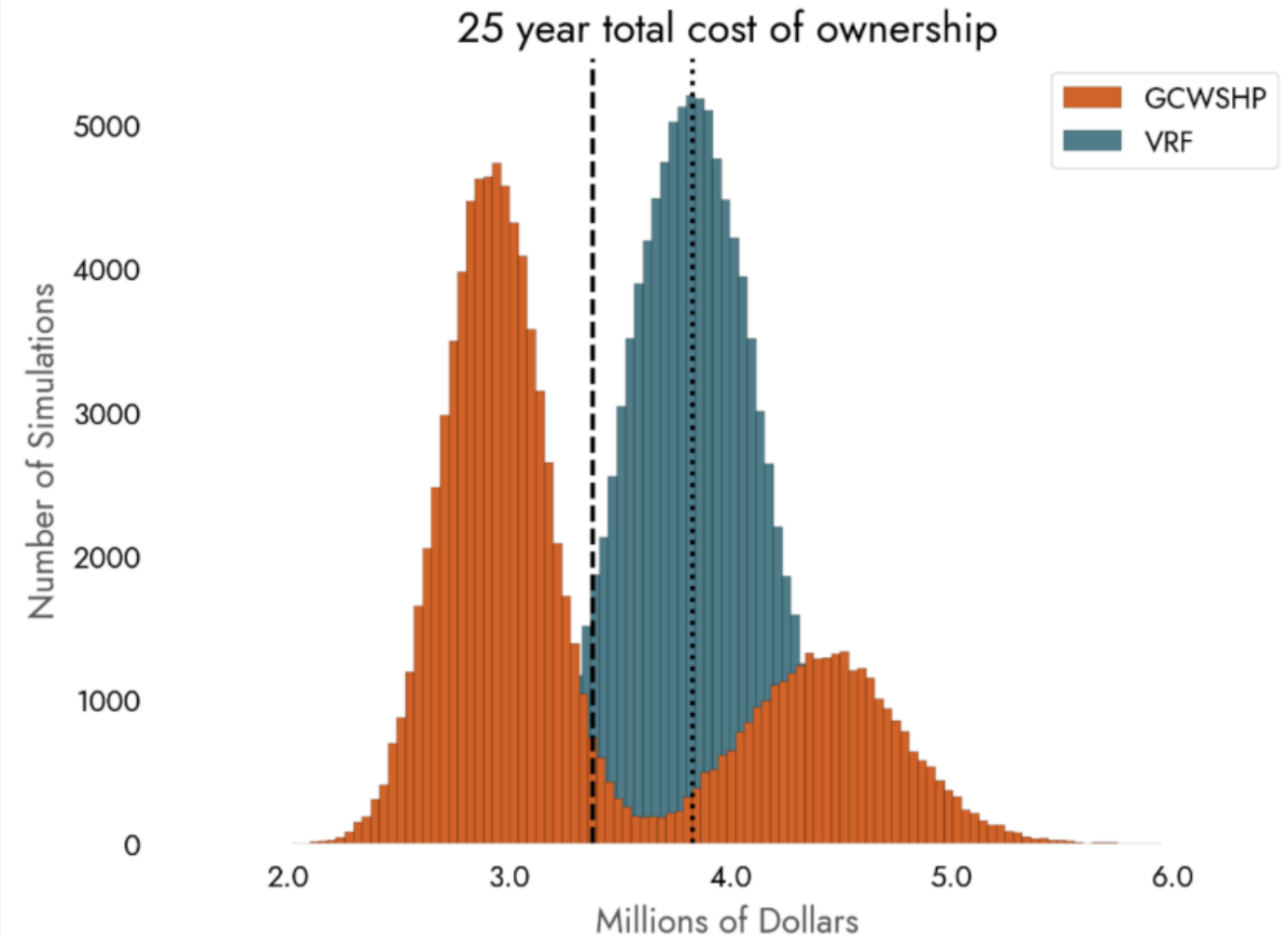
- Long-lived assets carry real value

MYTH #1: FIRST COST VS. TOTAL COST OF OWNERSHIP

REALITY: A higher first cost can still produce a better long-term outcome

What owners actually live with

- ✓ Utilities — year after year
- ✓ Maintenance and repair costs
- ✓ Replacement cycle timing
- ✓ Comfort and reliability

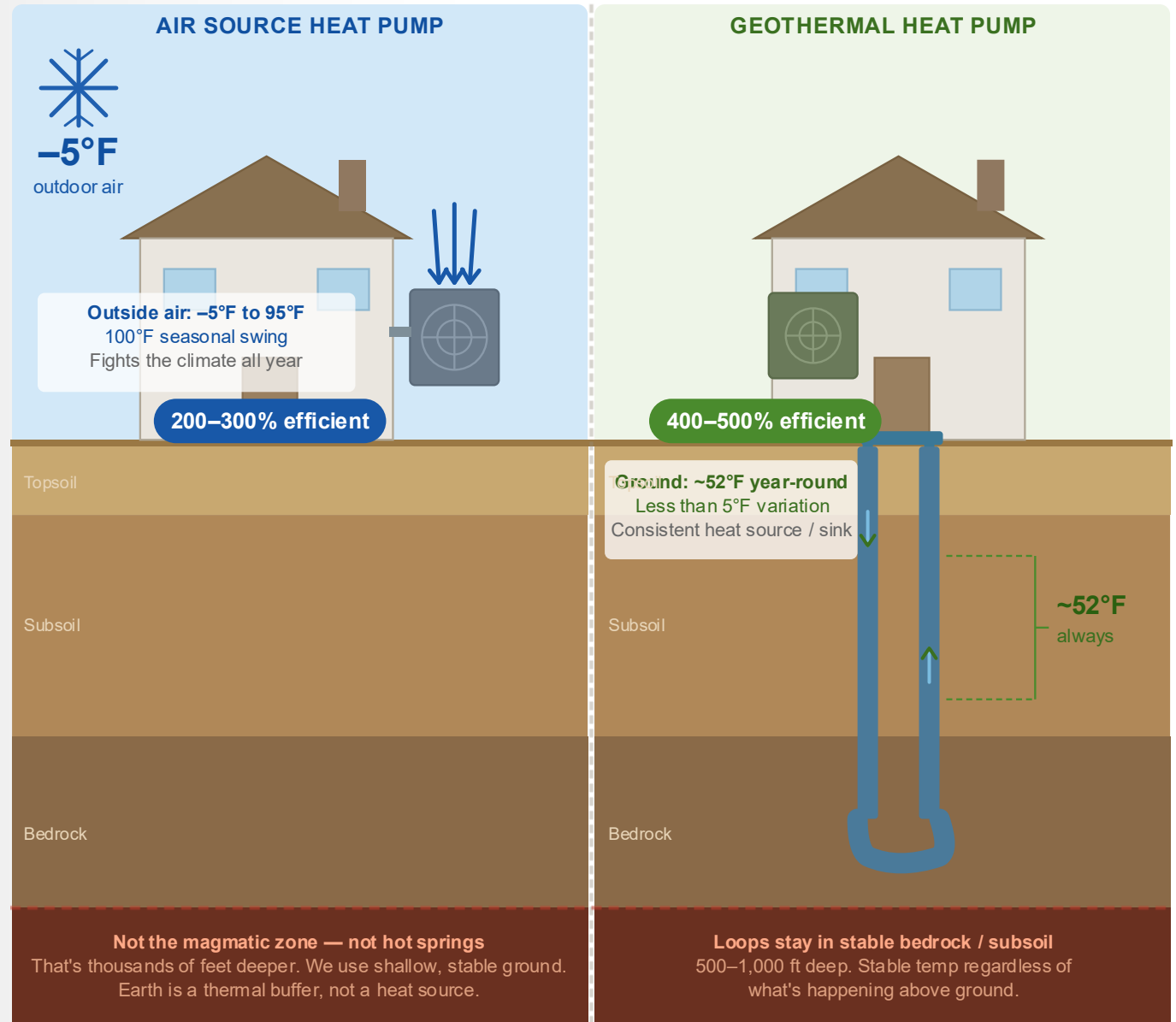


MYTH #2: GEOGRAPHY

Reality: **31%**

of geothermal heat pumps installed are in the Northeast

DOE Geothermal Data Repository

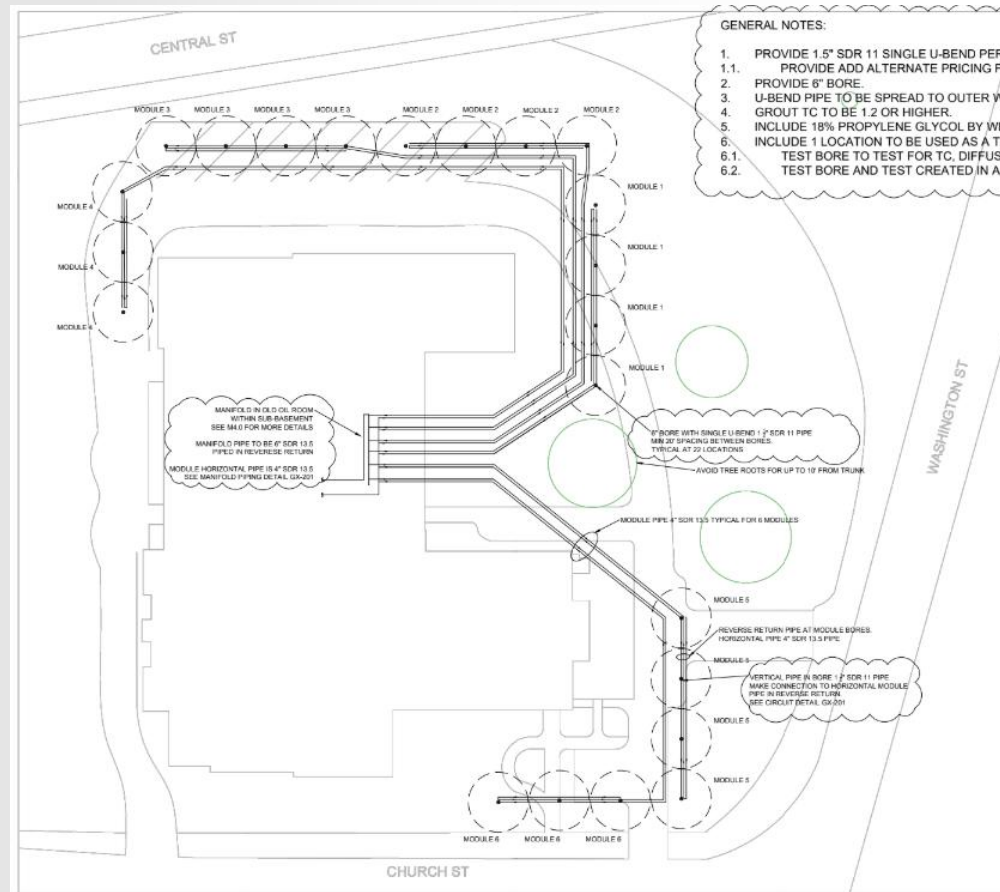


MYTH #3: Site

Reality: $> 1/3$

of installed geothermal systems
are in urban areas

Industry data



MYTH #4: DISRUPTION

Reality: Many retrofits can reuse existing infrastructure

- ✓ Existing hot water piping, coils & ducts can often be reused
- ✓ Lower construction costs
- ✓ Less disruption...

...but it depends

- What's the age?
- What's the condition?
- What are your heating and cooling needs?
- Can heating be shifted to other equipment?

Bottom Line:

- ✓ Find a partner who listens!
- ✓ Have honest conversations about heating and cooling needs

MYTH #5: INCENTIVES

Reality: Incentives still matter — treat them as part of the capital stack

- 30% ITC available through 2032, including nonprofits via Direct Pay
- Domestic Content riders can add another 10%
- Model incentive timing carefully — not as a simple upfront discount
- The right question: what is the net cost, and when?

BOTTOM LINE

Don't rule out geothermal for the wrong reasons.

- Start with the building, not the technology
- Establish shared goals for your future heating and cooling
- Study realistic options
- Compare them fairly
- Make an informed decision

Geothermal is not always the answer. But it should not be dismissed on myth, first-cost optics, or bad comparisons.