Building Confidence in Geothermal Energy: Supporting Informed Energy Decisions in Rural Communities

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CELT Clean Energy & Environment Legacy Transition

Project Overview & Objectives

Ground source heat pumps (GSHPs) are increasingly being considered as a way for municipalities to reduce energy costs, electrify buildings, and meet climate goals. While these systems can provide significant long-term energy and cost savings, they require substantial upfront investment. For many small rural communities, limited budgets and tax bases can make securing the capital needed for implementation particularly challenging.

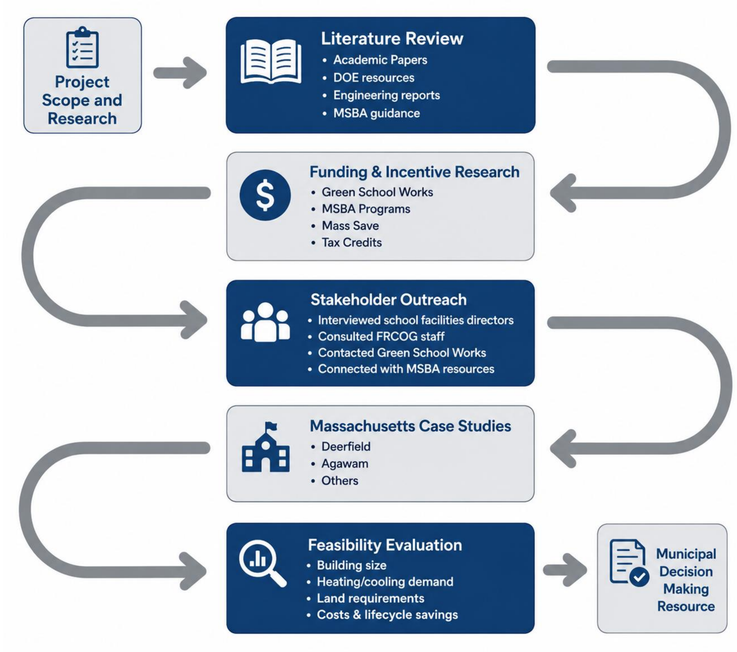
However, several Franklin County communities have had mixed experiences with older geothermal systems, creating skepticism among municipal officials and residents. At the same time, many FRCOG communities are small rural towns with limited budgets, staff capacity, and tax bases. Because major infrastructure investments represent significant long-term commitments for these communities, it is especially important to evaluate whether modern geothermal systems are technically feasible, financially practical, and appropriate for the scale of buildings and infrastructure found in Franklin County.

Objectives:

Research how modern ground source heat pumps operate

- Examine how the technology has evolved over the past decade
- Compare geothermal systems to alternative heating technologies
- Identify available state and federal funding opportunities
- Analyze case studies from New England communities
- Develop a resource that helps towns make informed energy decisions

Approach and Methods



Deliverables and Findings

Deliverable 1: Municipal Research Brief

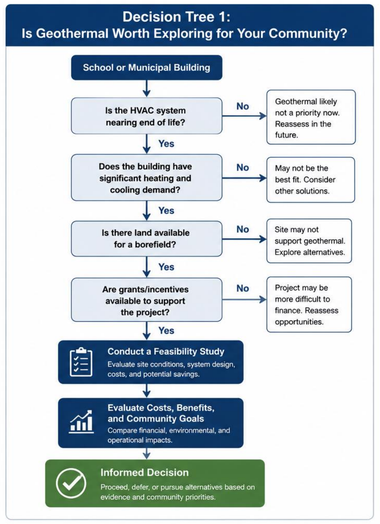
- 28-page research brief on ground source heat pumps
- Designed for municipal staff, energy committees, and local officials
- Focused on schools and small municipal buildings
- Included technology overview, costs, incentives, design considerations, and case studies

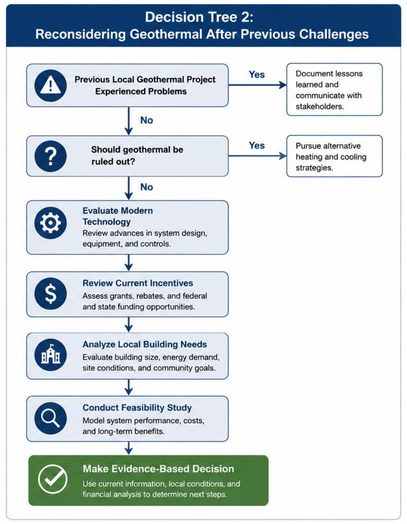
Deliverable 2: Massachusetts Geothermal School Case Studies

Community	Outcome	Key Lesson for Municipalities
Leverett, MA	Operated successfully for ~20 years	Long-term operation is possible, but aging infrastructure and maintenance planning are critical.
Erving, MA	Experienced clogging and operational issues	Water quality, system design, and ongoing maintenance can significantly impact performance.
Deerfield, MA	Technically feasible but not cost-effective	Not every site is a good candidate; site-specific feasibility studies are essential.
Agawam, MA	New geothermal high school currently under construction	Modern geothermal systems continue to be adopted in Massachusetts schools.
Fort River ES, Amherst, MA	Geothermal well field installed as part of new school construction	Integrating geothermal during new construction can improve project feasibility and efficiency.

Overall Finding
Previous geothermal challenges in Massachusetts highlight the importance of proper design, maintenance, and feasibility analysis. Modern geothermal systems should be evaluated using current technology, site conditions, and available funding opportunities rather than past experiences alone.

Deliverable 3: Framework for Evaluating Geothermal Opportunities in Rural Communities





Findings suggest that modern geothermal systems are more reliable than earlier generations and may be viable for schools and municipal buildings under the right conditions. Building size, site characteristics, project costs, and available incentives remain critical factors in determining feasibility.

Main Takeaways

1. Past geothermal challenges do not necessarily reflect the performance of modern systems.
Advances in system design, controls, and thermal modeling have improved reliability and performance.

2. Geothermal can be a viable option for schools and municipal buildings.
Schools are often strong candidates due to their long lifespans, large heating and cooling loads, and access to funding opportunities.

3. Successful projects require site-specific evaluation.
Building size, energy demand, available land, project costs, and incentives should all be assessed through a feasibility study.

Impact: Supporting Informed Energy Decisions in Rural Communities

Helping communities move from uncertainty to informed decision-making
Research and outreach provided municipal officials, energy committees, and community members with accessible information on modern geothermal systems, funding opportunities, and project feasibility. By improving understanding of costs, benefits, and risks, this work supports more confident and informed energy infrastructure decisions.

Project Impact
Rather than advocating for geothermal in every situation, this project helps rural communities determine when geothermal may be a technically feasible, financially practical, and appropriate investment.

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