



Climate-Friendly Heating and Cooling of Public Buildings with Geothermal

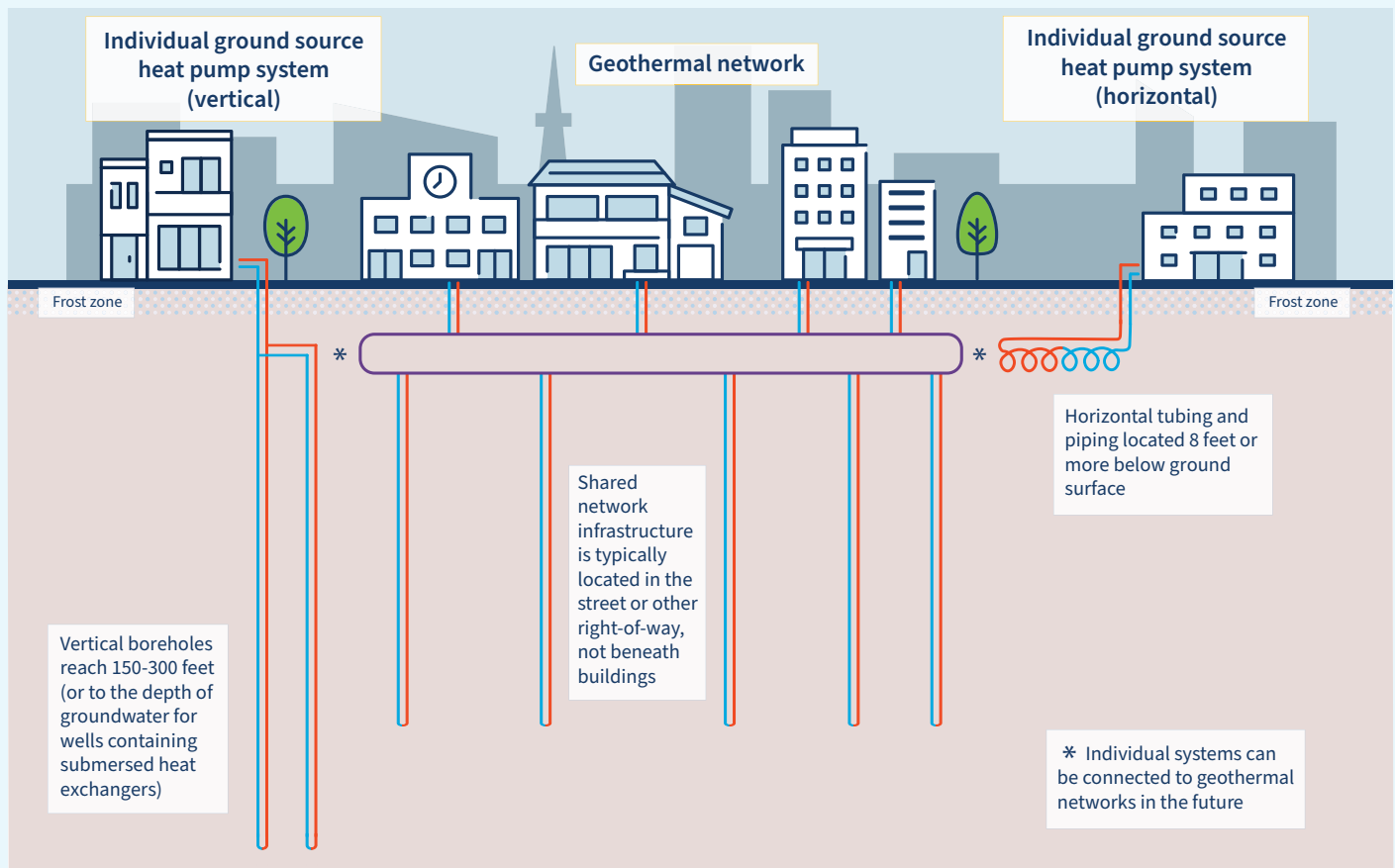
An Overview for Local and Tribal Governments in Minnesota

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Ground source heat pumps (GSHPs), also called geothermal energy systems, move thermal energy between the ground and the indoor air of buildings connected to the system. With a constant ground temperature below 8 feet in Minnesota, GSHP systems are the **most efficient way to mechanically heat and cool buildings**.

GSHP systems have been operating successfully in Minnesota communities for over 30 years. Recent interest has been driven by **expanded incentives, new funding opportunities, and ongoing technology advancements**.

Closed-loop installations are most common in Minnesota and can be configured horizontally or vertically, as shown in the image below. Geothermal networks, also known as thermal energy networks (TENs), connect multiple buildings to a shared system and achieve even more energy savings than individual systems.



Geothermal system layouts. (Data from workshop presentations; see Acknowledgments.)

GSHP systems are an appealing way for local governments to work toward climate goals while making long-term investments in public facilities. Here are just some of the **benefits**:

- Proven technology with long equipment life
- Reduced reliance on fossil fuels
- Reduced building energy use & operating costs
- Clean energy workforce development

GSHPs deliver up to 75% energy savings compared with conventional heating and cooling systems.

Geothermal Adoption in Minnesota

As of 2026, there are at least 86 publicly-owned ground source heat pump (GSHP) systems in 49 communities across Minnesota, implemented by cities, tribal nations, counties, schools, a regional organization, an airport authority, and state colleges & universities.

Many public facility types with **both heating and cooling needs** are good candidates for GSHP systems.

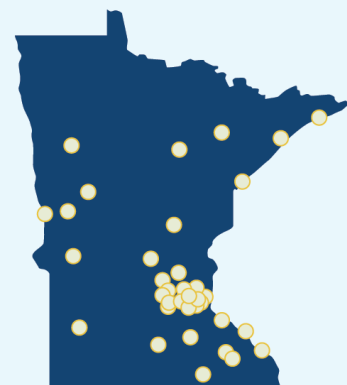
Geothermal Project Process

Pre-Project: Many Minnesota communities that have implemented GSHP systems have been motivated by climate and clean energy goals and commitments adopted in plans and policies.

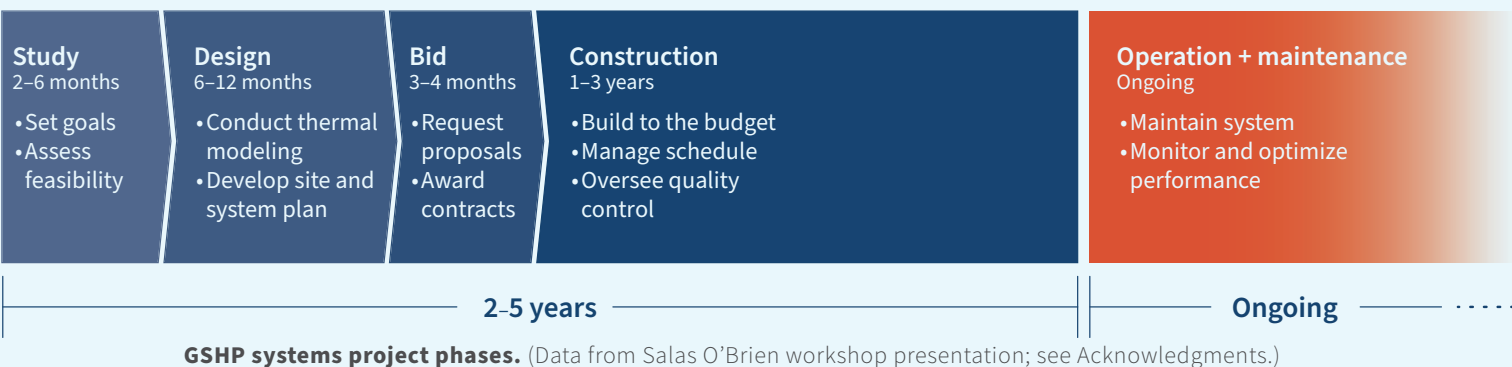
Project Planning: In addition to identifying funding sources, organizing a project team, and engaging stakeholders, local and tribal governments can take specific steps around site selection.

- For new buildings, consider GSHP systems, as they can have the lowest lifecycle costs compared with other options.
- For retrofits, prioritize buildings with high energy use intensity, available adjacent land, aging heating and cooling equipment, and other planned renovations.

Project Implementation: From study through construction, it can take 2–5 years to develop GSHP systems for individual buildings or limited geothermal networks, depending on the size and complexity.



MN communities with public GSHP systems.
(Data from workshop presentations, individual communications, and web research; see Acknowledgments.)



Funding Opportunities

A GSHP system, including the underground heat exchanger system and the indoor heating and cooling heat pump equipment, can have 50 percent higher upfront costs than conventional heating and cooling systems. Fortunately, there are several options to help finance and reduce the costs of GSHP systems:

- Utility rebates & technical assistance
- Private & public grants
- Federal technical assistance & tax credits
- Energy savings performance contracts
- Minnesota Climate Innovation Finance Authority
- General fund & capital improvement budgets

At least 30% of project costs may be recouped with federal tax credits.

More details: Visit this page to see the full guide on this topic: <https://betterenergy.org/community-energy-network/>

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