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City of Minneapolis Thermal Potential Study

Roundtable Discussion

Minneapolis Central Library

Wednesday, June 17, 2026

Housekeeping

- Please help yourself to refreshments
  - All serve ware is compostable or recyclable
- Restrooms are located through north meeting room door
- Wi-Fi: HCL_Public, no password

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Agenda

1:00	Introductions and Study Scope
1:25	Thermal Energy Networks 101 Technical Q&A
1:50	Overview of Barriers and Opportunities
2:00	Facilitated Breakout Group Discussions: Barriers and Opportunities
3:10	Breakout Discussions Report Out
3:25	Thermal Potential Study Next Steps
3:30	Optional Informal Networking

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Introductions

Today's roundtable seeks to engage the business community, real estate developers, facility managers, financing institutions, and other entities that would play important roles in future thermal energy network (TENs) projects.

Project Team

City of Minneapolis	FVB Energy–technical consultant	GPI–facilitation consultant
Alice Froehlich	James Bohn	Aaron Backs
Luke Hollenkamp	Scott Emery	Alexis Troschinetz
Megan Hoye	Amber Eckstein	Catherine Kemp
Nadia Khan		Hallie Turner
		Audrey Negro
		Aileen Cole

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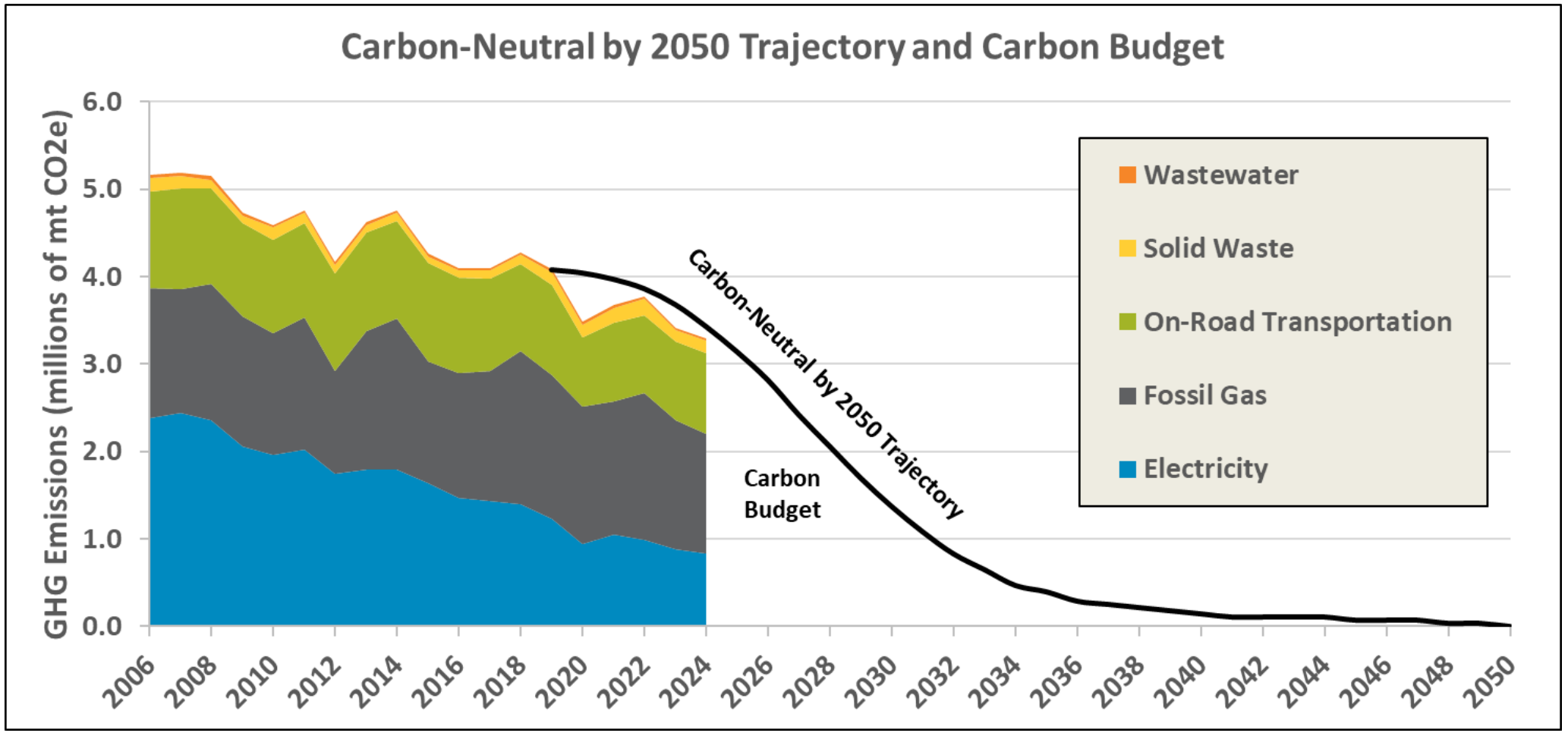
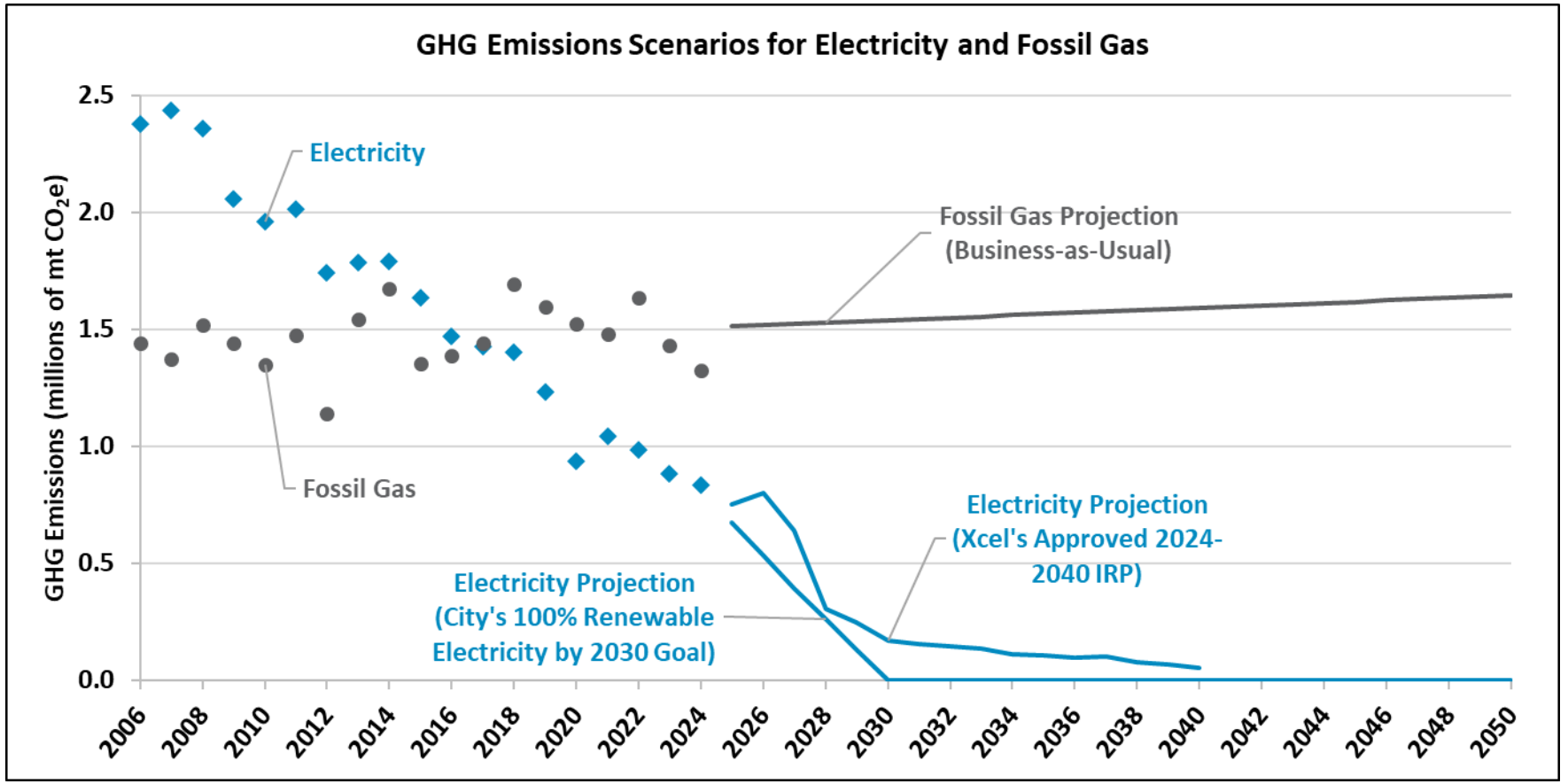
Why

Minneapolis has community-wide climate and equity goals



Why

Gas emissions are biggest barrier to achieving these goals – new solutions like Thermal Energy Networks are needed



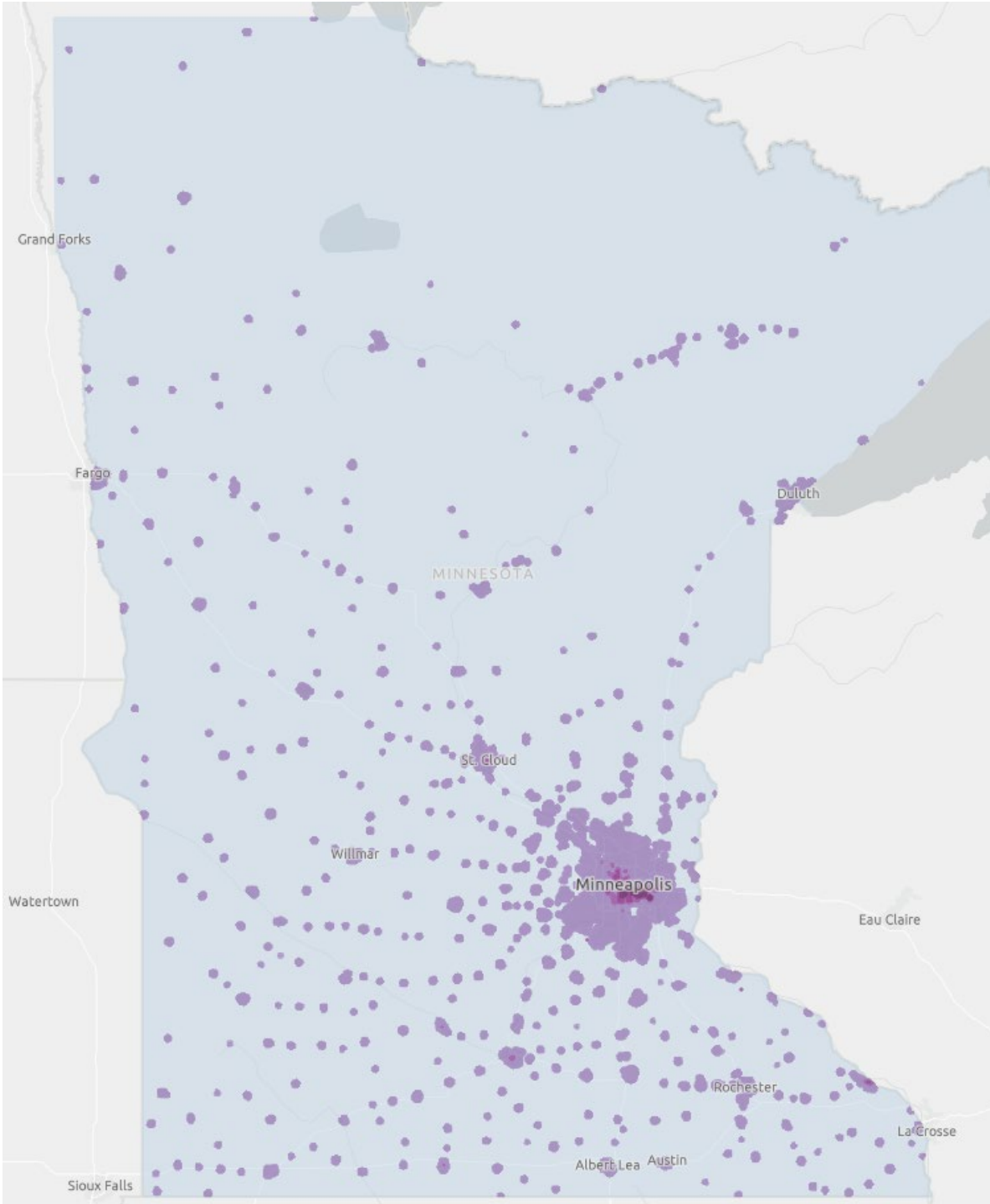
COMMERCE DEPARTMENT

Minnesota Thermal Energy Network Site Suitability Study

2024 Minn. Laws Chap. 126 Art. 6 Sec. 51 (d)

January 15, 2026

https://www.lrl.mn.gov/docs/2026/mandated/260051.pdf



Thermal Potential Study

Study Objective

The Thermal Potential Study will help the City identify geographic zones within the city with high suitability for thermal energy networks, with consideration for a wide range of factors (social, technical, financial, etc.).

The Thermal Potential Study is *not:*

- A final decision-making tool for identifying where TENs may or may not be located in the City
- A detailed building-by-building or project-specific analysis
- An examination of TENs for primarily single-family areas

TEN Zone: A geographic area within the City of Minneapolis that is found to have high potential for developing TENs to deliver low-to-no-carbon heating and cooling

Minneapolis Study Screening Indicators

Category	What this looks at
Tier 1 - Thermal Resource Technical Potential	Evaluation of thermal resources
Tier 2 - Building Technical Potential	Building Heating & Cooling Needs
	Redevelopments / New Developments
	Existing Building HVAC
Tier 3 - Values	Green Zone
	Additional Social Factors (e.g. Energy Burden)
	Community Interest
	City-Owned Facilities
Tier 4 - Tipping Factors/Risks	Environmental, constructability, and economic indicators that provide a final differentiation on the potential of a TEN Zone.

Final Deliverable: Map of High-Potential TEN Zones

Thermal Potential Study Process Overview

Phase 1		
March 2026	**Technology Review** Overview & characterization of considered technologies	
April 2026	**Technical Potential & Geographic Analysis** Initial map creation; preliminary Zone location identification	
Phase 2		
Round 1		
June – July 2026	**Stakeholder Engagement & Principles** Input on Zone prioritization criteria; guidance on development models	**Focus A** Climate and environmental justice organizations **Focus B** Gas and electric utilities, thermal energy service providers, clean energy organizations **Focus C** Investors, developers, business associations
June – July 2026	**Implementation Pathways** Policy barriers & opportunities; ownership & development models	
September 2026	**Identification of Potential Zones**	
Round 2		
Summer/Fall 2026	Targeted engagement meetings in areas identified as potential locations for TEN Zones	

April 2027 – Final Report Published

Meeting Objectives

1. Share the purpose and scope of the City of Minneapolis' Thermal Potential Study.
2. Provide an overview of thermal energy networks (TENs).
3. Identify barriers and potential opportunities related to TENs deployment in Minneapolis with a focus on development and ownership models, financing and funding, state and local policy solutions, and the City's role.
4. Understand what success looks like in the development of TENs.

Why are you here?

- Today's roundtable seeks to engage the business community, real estate developers, facility managers, financing institutions, architects, and other entities
- Each could play an important role in future thermal energy network (TENs) projects:
  - Existing buildings could connect to a new TEN that would provide building heating and cooling
  - New developments can be designed to connect to a new TEN

MINNEAPOLIS THERMAL POTENTIAL STUDY: TENS 101

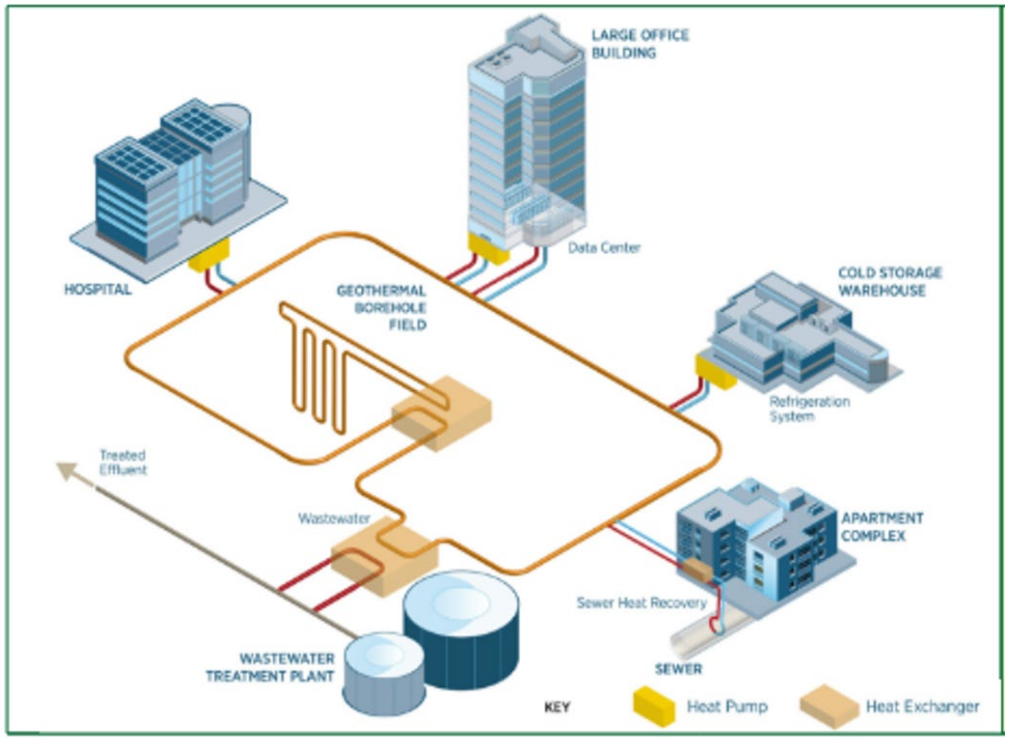
Stakeholder Engagement Introduction to Thermal Energy Networks

May 2026

What is a TEN?

Minnesota Statute § 216B.2427 defines a TEN as:

> "Thermal energy network" means a project that provides heating and cooling to multiple buildings connected via underground piping containing fluids that, in concert with heat pumps, exchange thermal energy from the earth, underground or surface waters, wastewater, or other heat sources.

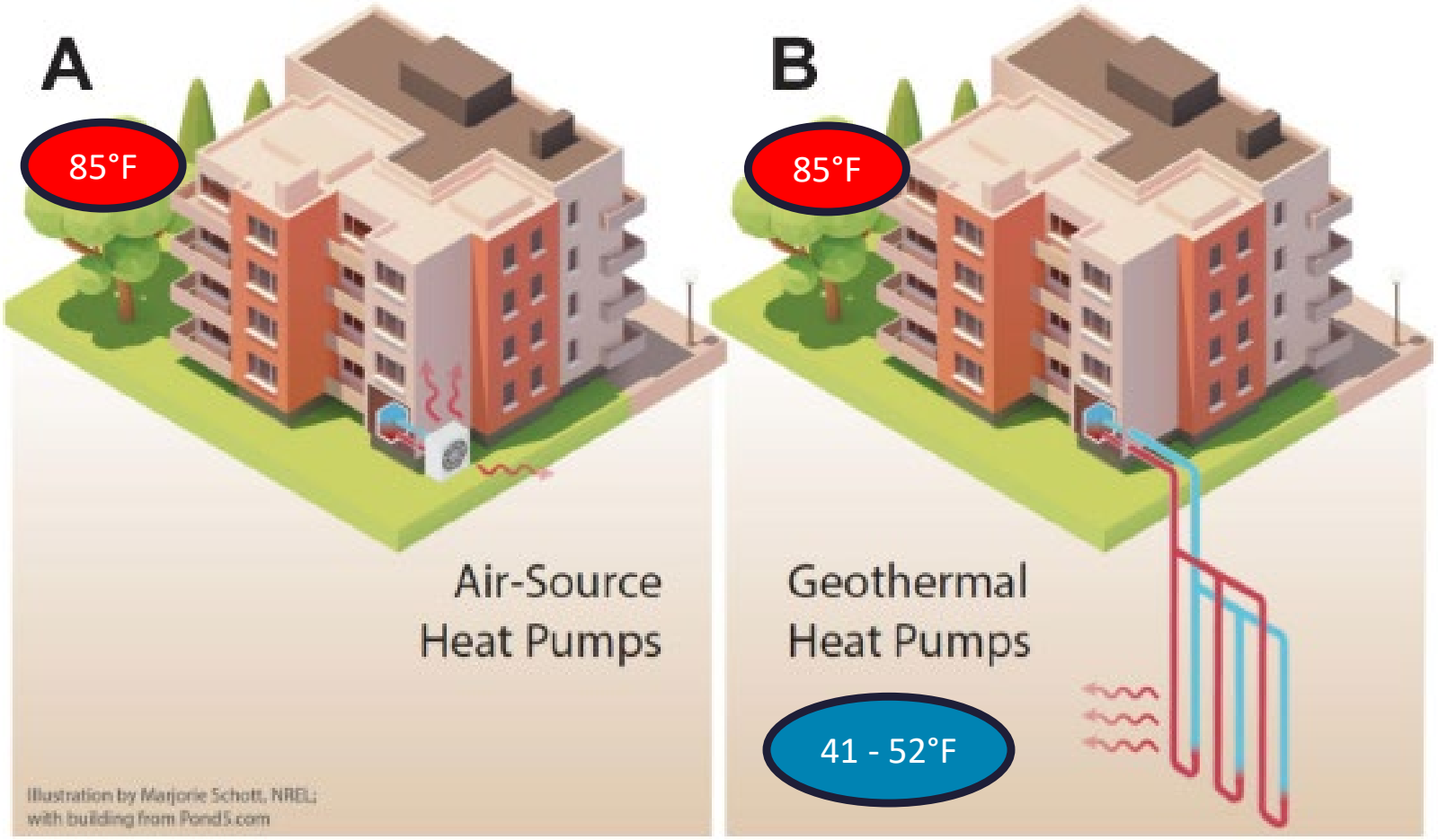


A Note on Terminology

The Study uses Thermal Energy Network or TENs. However, other terms may be used to describe TENs:

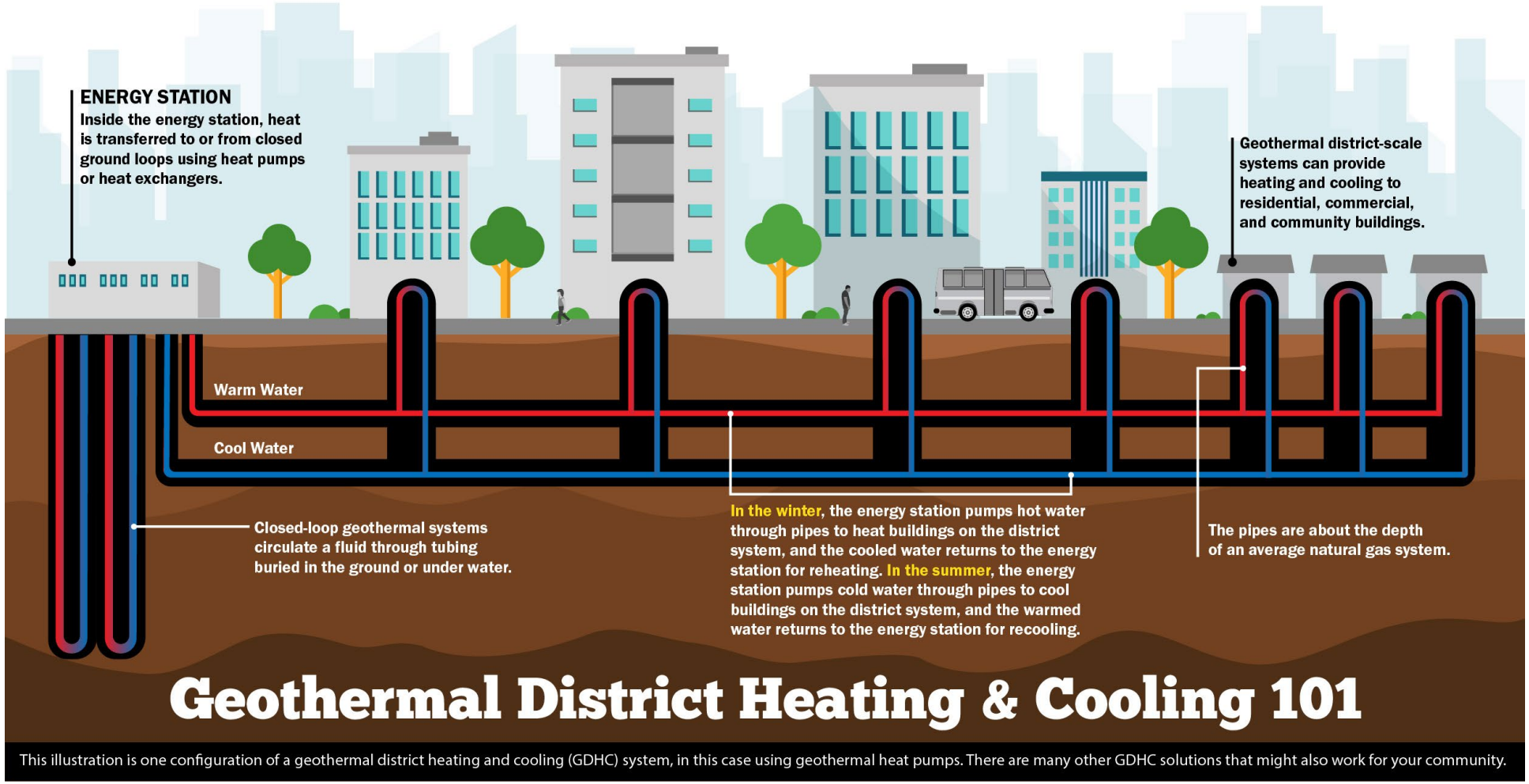
- Utility Thermal Energy Network
- Networked Geothermal
- Community Geothermal Systems
- Geothermal District Heating and Cooling
- Geoexchange Network
- Ambient Loop / Ambient Temperature Loop (ATL) Systems
- 5th Generation District Energy Systems

What Are Geothermal Heat Pumps



Source: U.S. Department of Energy, "Pathways to Commercial Liftoff: Geothermal Heat Pumps," 2025.

WHAT IS A TEN?



This illustration is one configuration of a geothermal district heating and cooling (GDHC) system, in this case using geothermal heat pumps. There are many other GDHC solutions that might also work for your community.

MN TENs PROJECTS

The Heights Geothermal District Energy System

Source: MN Climate Innovation Finance Authority

Rochester, MN Network Geothermal

Source: Peterson Well Drilling

TENS PROJECTS

Princeton University Steam to Hot Water Conversion

Source: FVB Energy Inc.

Thermal Sources and Sinks

Thermal sources and sinks include:

- Ground source heat pumps
- Surface water heat exchangers (lakes/rivers/seawater)
- Sewer heat recovery/wastewater heat exchangers
- Data center waste heat
- Industrial waste heat
- Thermal energy storage

Advantages & Challenges

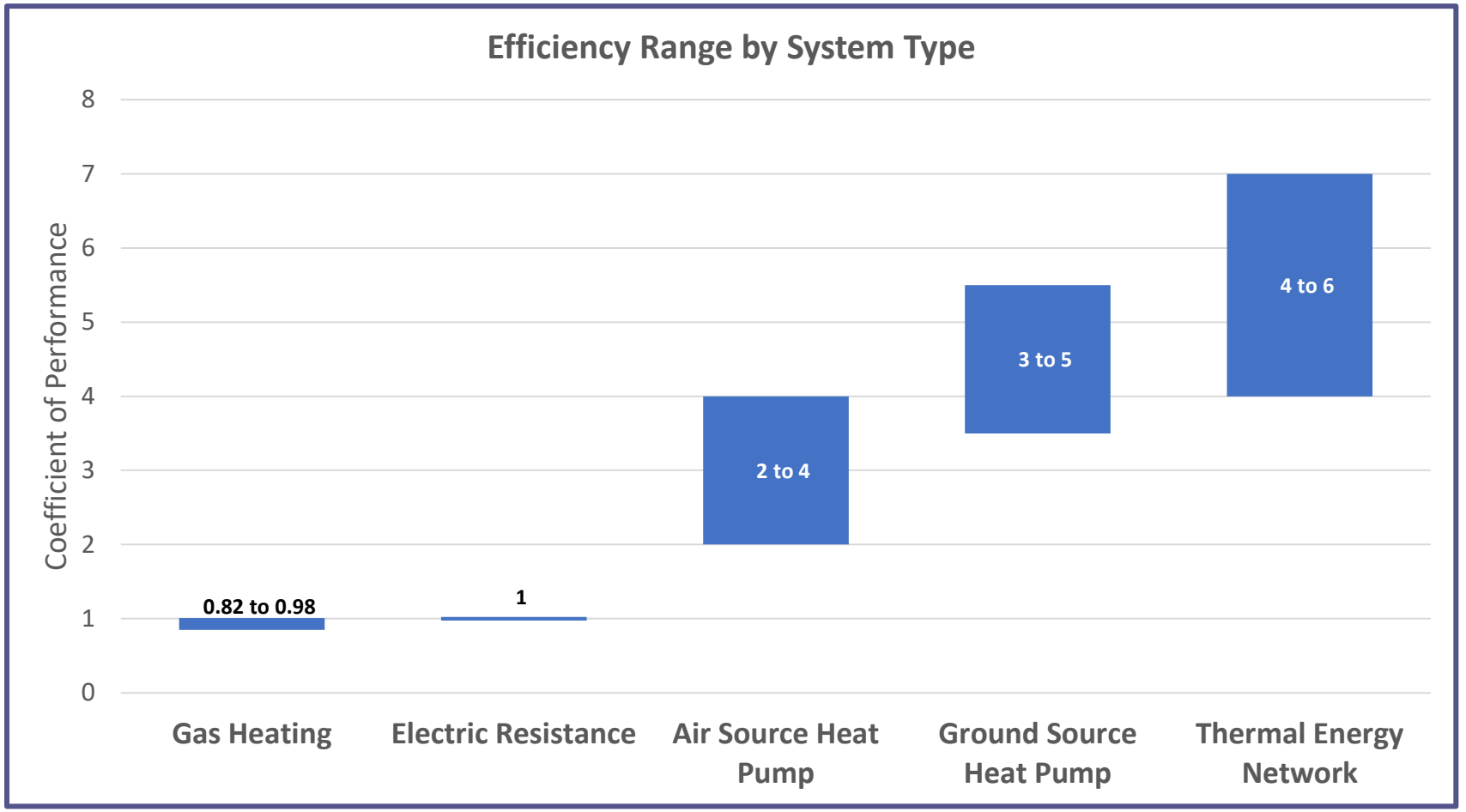
- Decarbonize at Scale
- High Efficiency
- Lower Lifecycle Operating Costs
- Grid Optimization
- Health & Community Benefits
- Existing Skilled Workforce

Advantages

- High Upfront Capital Costs
- Building Conversion Costs
- Complex Ownership

Challenges

TEN ADVANTAGES



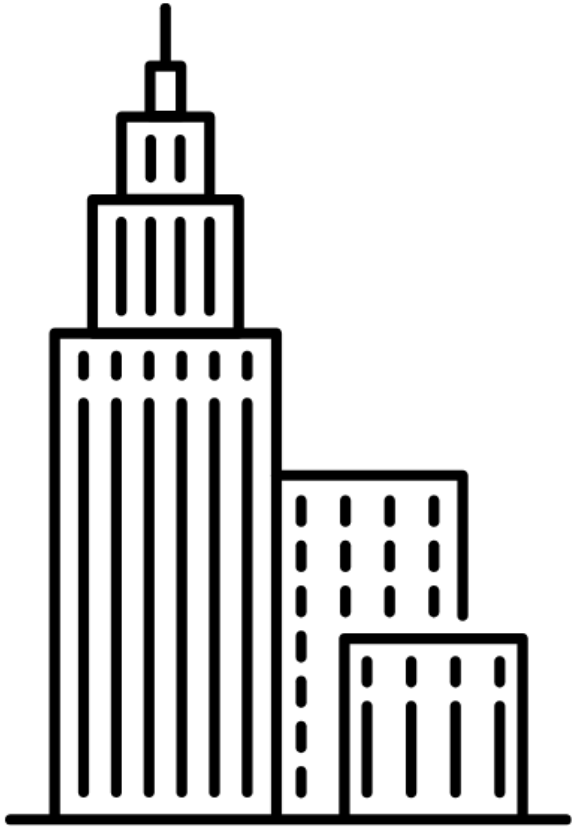
Deploying TENs in Existing vs. New Buildings

Connecting Existing Buildings

- Requires HVAC system upgrades
  - Building conversion costs
  - Potential disruption for building tenants

Connecting New Buildings

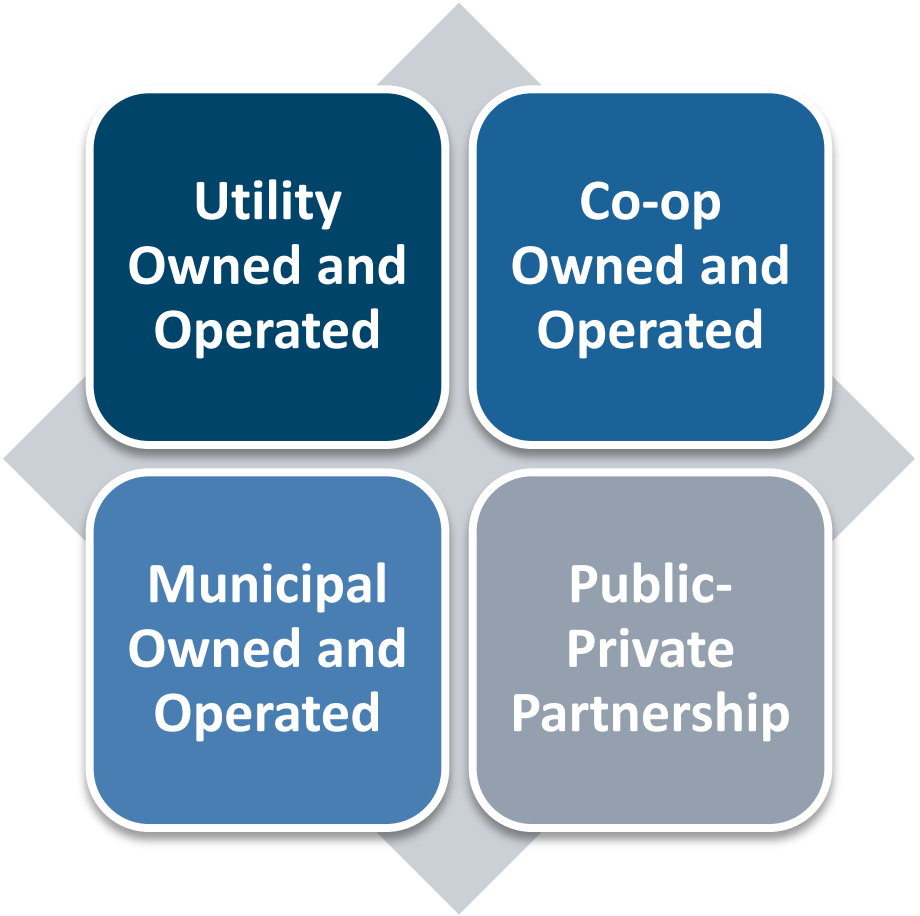
- Provides an opportunity to design buildings from the start to readily connect to a TEN
  - Prevents the need to pay to retrofit buildings for low- to no-carbon heating in the future



Anchor Tenants

Large thermal user(s) providing base load and operational stability; anchor customers reduce system risk and support project financing

Several Possible Ownership Models



Thank You

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Recommendations, Barriers, and Opportunities

Minnesota Thermal Energy Network
Site Suitability Study
January 2026

COMMERCE DEPARTMENT

Minnesota Thermal Energy Network Site Suitability Study

2024 Minn. Laws Chap. 126 Art. 6 Sec. 51 (d)

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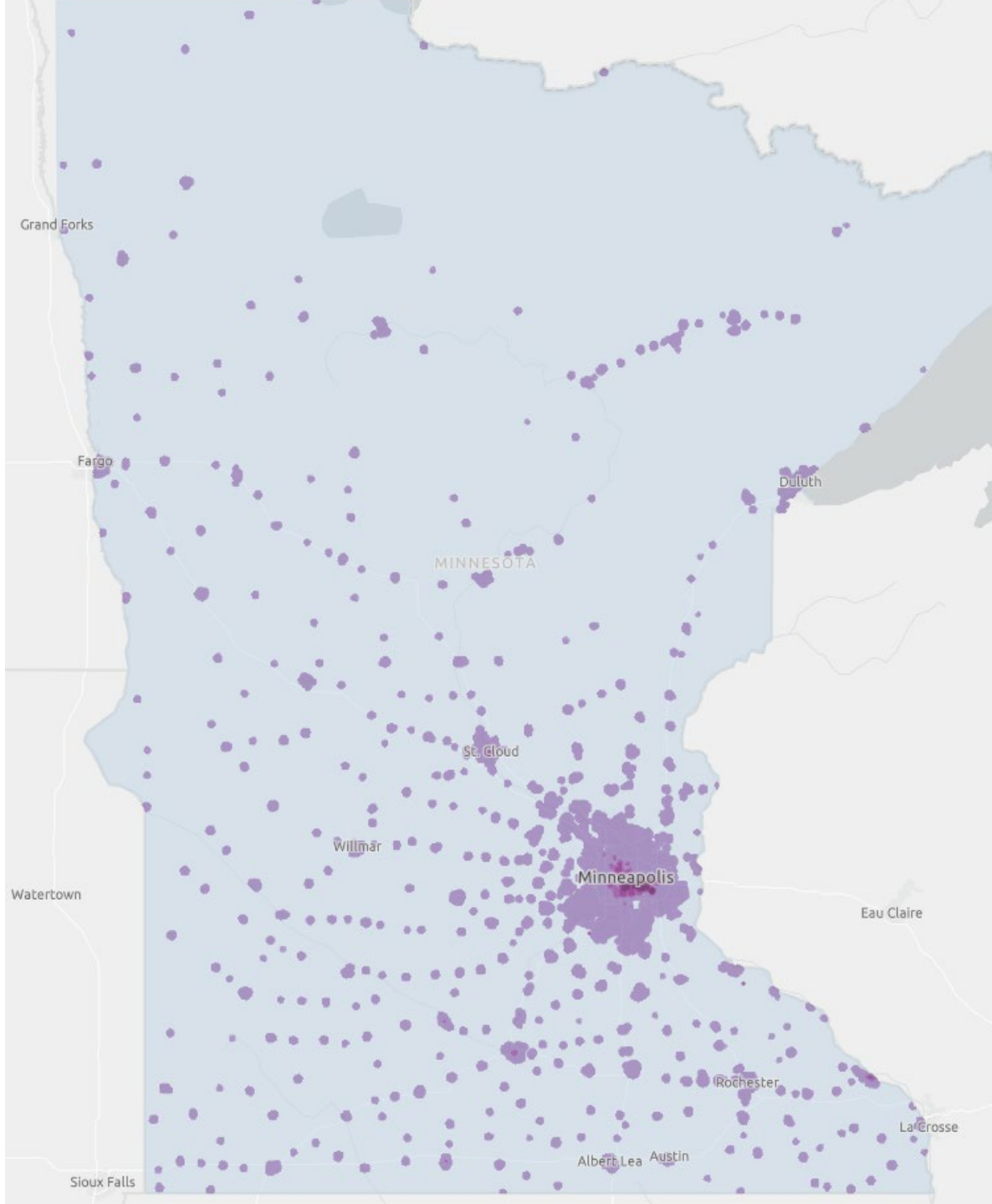

Recommendations

State & local government:

1. Conduct detailed feasibility studies
2. Unlock funding, financing opportunities, and incentives
3. Establish policy and regulatory frameworks
4. Develop representative projects
5. Create statewide TEN development roadmap

Commercial developers, owners, and operators of TENs:

1. Engage key stakeholders early
2. Conduct detailed feasibility studies
3. Secure funding and incentives
4. Align projects with state goals

Barriers and Opportunities

	Financing and funding	**Development and ownership models**	**Other** (e.g., state and local decision-making)
Barriers	• High up-front capital costs	• Shared thermal resource across multiple buildings with different owners & customer appliances = ownership & permitting challenges • Complex landscape of environmental, utility, land ownership, and legal considerations	• Limited geothermal drilling workforce • Regulated utilities lack policy certainty
Oppor-tunities	• Innovative financial models (e.g., leasing arrangements, creation of public improvement districts, municipal utility districts) • Federal, state, and local financial support can help de-risk	• Public, private, and community ownership models, variations on public-nonprofit and public-private partnerships • Single- or municipal-owned sites reduce barriers to construction, act as first movers to build confidence for other projects with more complex ownership models	• Legislation to enable regulated utility cost recovery for TENs (NGIA pilots) • Streamline licensing and permitting • Workforce development • Alignment with emissions goals • Energy affordability + grid benefits

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Facilitated Discussions:
Transition to breakout groups

Discussion Questions

1. What challenges might be associated with **development, ownership, and operation** of future TENs in Minneapolis? We are looking for challenges specific to Minneapolis, in addition to what has been outlined in statewide studies.

2. What might be some **financing and funding challenges** (or opportunities) associated with deploying future TENs in Minneapolis?

3. *For businesses:* What could you see as barriers for your own business (or business type for those representing many) to participate in a TEN?

4. *For developers:* Say you are constructing a new building or set of buildings. You have heard that nearby buildings are exploring the possibility of constructing a TEN. What are barriers that might prevent you from participating?

Discussion Questions

5. What state or local actions or policy solutions would help address some of the identified TENs deployment challenges? What is the City's role in these solutions?

6. For a TEN project to be successful, there needs to be participation from a certain number of buildings:

- One or more so-called "anchor facilities", or a large thermal user providing base load and operational stability that reduce system risk and support project financing.
- Other nearby buildings (e.g., apartments, businesses) that would join the TEN.

How might the City or other entities gauge interest from these potential TEN users? How should they be engaged and over what duration?

Breakout Group Instructions

- Breakout A (green): N-402, fourth floor
- Breakout B (yellow): N-202, second floor
- Breakout C (pink): remain in meeting room

Return to main room at 3:05pm

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Facilitated Discussion: Key takeaways from breakout groups

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Next Steps

Next Steps

- Continued technical assessment
- Round 1 Engagement
  - *June – July 2026:* One more roundtable
- Round 2 Engagement
  - *Late summer/fall 2026:* Interviews and focus groups with business associations, neighborhood organizations, and other entities located in areas found to have high suitability for a TEN
- April 2027: Final Report

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Thank You!

What Changes for Building Owners?

Potential TEN Connection Model:

- **New utility service: thermal network access**
  - Pay **connection fee + ongoing service charge** for shared thermal resource
- **Shift from fuel to electricity**
  - No on-site gas/oil systems
  - Building uses electricity to operate heat pumps and distribution
- **Lower and more stable operating costs**
  - High efficiency reduces energy use
  - Avoid fuel price volatility

Mechanical Systems Impacts:

- **Reduces large central equipment**
  - Eliminates boilers, chillers, cooling towers
- **Replaces with distributed systems**
  - Heat pumps + compact energy transfer station (ETS)
- **Typically reduces overall plant space**
  - Smaller mechanical rooms; frees roof/basement space
- **Shifts (not eliminates) equipment**
  - More distributed units within the building
- **Outcome depends on building type**
  - New buildings → optimized, smaller footprint
  - Existing buildings → variable (retrofit constraints)