



## **POLICY BRIEF: THERMAL ENERGY NETWORKS**

**Thermal energy networks (TENs) provide an opportunity to reimagine how we heat and cool our homes, free from fossil fuels.**

TENs are an elegant solution to a complex problem faced by communities across the country: how to eliminate the use of fossil fuels in our buildings, at scale. With TENs, the existing gas pipe system that currently heats buildings is replaced by an underground water loop system to provide highly efficient heating and cooling to connected buildings.

TENs can be designed at any scale and in many configurations that can be connected to each other over time. Networked Geothermal is a type of TEN that uses

shallow boreholes (100 to 600 ft) to harness the temperature of the earth (55 degrees F) to heat and cool buildings that are connected to the network. TENs do not always need boreholes, as temperature from a large body of water or from other sources of heat—such as energy intensive buildings (e.g. a datacenter, skating rink, grocery store) or wastewater—can also be used.

Currently, only four states have legislation that mandates or allows utilities to develop thermal energy network pilots. What follows is a summary of that existing legislation as well as considerations for advocates who are currently crafting TEN legislation for their states.



## **10 CONSIDERATIONS FOR TEN LEGISLATION**

1. Permit gas and electric utilities to sell thermal energy.
2. Permit communities, co-ops, developers, and water utilities to also sell thermal energy.
3. Reform the “obligation to serve” by revoking its fuel specificity, such that gas utilities are obligated to serve thermal energy but not gas in particular.
4. Include labor transition, training, and recruiting plans in the pilots.
5. Prioritize pilots in existing disadvantaged communities and areas with leak-prone pipe.
6. Identify financing mechanisms: existing pipe replacement funds, securitization, fee in gas or electric utility bill, or the creation of a thermal energy fund.
7. Create a plan for building retrofits that specifies who pays for appliances, electrical upgrades, weatherization, and upkeep.
8. Eliminate subsidies for gas service expansion (i.e. line extension allowances).
9. Where applicable, align timeline with state climate commitments.
10. Direct PUC / PSC to study rates.

# THERMAL ENERGY NETWORKS

## Legislation Summary

PROVISIONS	MASSACHUSETTS	MINNESOTA	NEW YORK	COLORADO
Date Passed	1/14/2021 8/11/2022	6/26/2021	7/5/2022	5/11/2023
Terminology	Networked Geothermal	District Energy	Thermal Energy Networks	Thermal Energy Networks
Utilities Can Sell Thermal Energy	Allowed for pilots	Allowed	✓	Allowed for pilots
Pilots	Allowed	Allowed for innovation plans	Mandated for large utilities	Mandated for large utilities
Rate & Cost Recovery	Determined by Utility Commission			
EJ & Consumer Protection	✓	✓	✓	✓
Data Reporting Required	✓	✓	✓	✓
Alignment with Climate Mandates	✓	✓	✓	✓
Filing Timing	< 24 months		< 3 months	< 15 months
Labor			✓	✓
Plans for Gas Pipes?	✓			✓
Retrofit Existing Buildings				✓
Obligation to Serve				

## SUMMARY OF LEGISLATION

### MASSACHUSETTS

Massachusetts was the first state to enshrine provisions for TEN pilots in law, using their [2021 Climate Roadmap](#) to do so. This roadmap permits utility-owned TEN pilots and allows those utilities to bill customers for thermal energy. Eversource Energy is the first utility in Massachusetts [to break ground](#) on a pilot project, with National Grid following close behind.

Massachusetts continues to enact legislation to further refine and promote thermal energy networks. The [2022 Clean Energy and Offshore Wind](#) bill added provisions specifying that TEN pilots can be paid for with funds from the pipe replacement program known as the Gas System Enhancement Plan.<sup>1</sup> Instead of using this cost recovery mechanism to install new gas infrastructure and locking in upwards of 50 years of emissions, it can be used for “non-emitting renewable energy infrastructure.”

In the current legislative session, [The Future of Clean Heat](#) bill proposes several provisions that would authorize, incentivize, and finance the transition from gas to non-combusting renewable thermal energy. The bill would:

- Allow gas companies to sell non-combusting thermal energy in addition to gas and to install the associated infrastructure, including networked thermal loops with ground

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<sup>1</sup> HEET explains that “Massachusetts has one of the oldest natural gas systems in the country, with around [22%](#) of the pipes under the ground considered ‘leakprone’ in 2020. Massachusetts created GSEP in 2014 as a way for its six investor-owned natural gas distribution companies to accelerate the replacement of this leaking infrastructure by 2039.” <https://heet.org/gsep/>

source heat pumps. Utilities would build this network using their skilled workforce and existing rights of way.

- Permit gas companies to meet the “obligation to serve” by providing customers with thermal energy, including networked geothermal ground source heat pumps or air source heat pumps.
- Establish a “thermal transition fund” to finance ongoing TEN installations.
- Disallow depreciation of new gas infrastructure beyond 2050 in line with the Commonwealth’s net-zero emissions mandate.
- Mandate gas utilities to create gas transition plans to non-combusting thermal energy and to pursue neighborhood-wide electrification projects, allowing municipalities and customers to participate in the planning.

The bill lays out the key pathways for scaling up thermal energy from singular pilots to a comprehensive, strategic plan for gas utilities and their workers that could create an emissions-free energy future.

### MINNESOTA

In 2021, Minnesota passed the [Natural Gas Innovation Act](#) (NGIA), which encourages gas utilities to propose “innovation plans” that consider using low-emission alternatives to methane gas, including electrification, district thermal energy, carbon capture and storage, hydrogen, RNG, energy efficiency, and innovative technologies. Currently, participation is optional and there is no specific timeline for completion, though submitted plans are subject to review and approval by the Minnesota Public Utilities Commission (PUC).

As of September 2023, Centerpoint Energy was the only utility to have submitted its five-year [NGI plan](#), though Xcel energy is expected to submit their plan in the near future. While the vast majority

of Centerpoint's plan is dedicated to using RNG and hydrogen to lower emissions, it also includes the development of a thermal energy network pilot. Advocates are hoping to pass legislation in the future to further direct the contents of the NGL plans in order to encourage use of non-emitting renewable energy infrastructure instead of RNG and hydrogen.

## NEW YORK

In 2022, the groundbreaking [Utility Thermal Energy Network and Jobs Act \(UTENJA\)](#) was passed in New York. This bill enables both gas and electric utilities to build, own, operate, and sell thermal energy. In addition, the bill includes support for transitioning utility workers and promotes good union jobs for local residents in the expanding decarbonization sector.

The bill is significant not only for this innovative approach to transitioning New York's energy system away from gas, but for how it was supported by a diverse range of stakeholders who are not frequently aligned on issues related to building decarbonization. Environmental organizations, environmental justice advocates, organized labor, consumer advocates, building industry, and utilities collaborated on a bill that not only allowed for the creation of utility-scale thermal energy infrastructure projects but also laid the groundwork for a just transition for utility workers and the inclusion of under-represented workers in labor unions through pre-apprenticeship programs. Many of the groups that worked on UTENJA continue to collaborate on advocacy for thermal energy networks through [UpgradeNY](#).

## COLORADO

Colorado has passed several bills in recent years to spur the development of geothermal energy and thermal energy networks. In 2022, Governor Jared Polis identified geothermal energy as the annual theme of the Western Governors' Association, which he titled "[The Heat Beneath Our Feet](#)." This same year, two bills supporting the development of geothermal energy (Geothermal Energy Grant, Program [HB22-1381](#) and Encourage Geothermal Energy Use [SB22-118](#)) became law.

These policies and projects are bolstered by three recent complementary laws: the 2021 clean heat standard ([SB21-264](#)), which requires gas utilities to file plans to reduce GHG emissions from end uses by 4% by 2025 and 22% by 2030; the 2022 Building Greenhouse Gas Emissions bill ([HB22-1362](#)), which requires the adoption of the 2021 IECC with electric, PV, and EV ready provisions; and the Utility Regulation Bill (Removing Barriers to Clean Heat ([SB23-291](#)), which eliminates line extension allowances.

In 2023, Colorado passed its first law specifically targeting thermal energy networks. The [Thermal Energy Act \(HB23-1252\)](#) modifies the state's recent clean heat standard by stipulating that thermal energy networks can be counted as an acceptable "clean heat measure" to meet GHG reduction goals. In addition, it mandates that large gas utilities (serving >500,000 customers) propose at least one TEN pilot by September 2024. It also establishes labor standards for state or public university-owned thermal energy projects and tasks the Colorado PUC in creating rules around the regulation of this technology, determining if additional legislation is necessary, and considering the impact that the proposed pilots will have on the state's utility workforce.

## TEN PILOT PROJECTS

Several states are pursuing novel approaches for using this technology at neighborhood scale.

### Utility-Owned Model

**There are currently 17 utility-owned TEN pilots in the proposal or planning stages.**

- Eleven proposed pilot projects and 3 feasibility studies in New York are under consideration by the NY Public Service Commission. There are more pilot projects being developed.
- Five pilots (Eversource: 1; National Grid: 4) have been approved in Massachusetts since 2021.
- In 2023, Centerpoint Energy in Minnesota proposed a networked geothermal district energy system as part of their 5-year innovation plan.

**There are currently two utility-owned TEN installations under construction.**

- In 2022, [Eversource Energy](#) in Massachusetts broke ground on the first gas utility-installed networked geothermal system in the nation. [The system will provide heating and cooling](#) to 140 customers in homes and businesses.
- In April of 2023, [National Grid](#) broke ground on its first networked geothermal system in Lowell, MA.

## EXISTING SYSTEMS

While the utility-owned model for TENs is new, the technology has been successfully operating in other settings for years.

### Community and Single-Owner Models

**Colleges and universities** have been installing TENs for years to decrease emissions, save on energy costs, and reduce water use.

- *Examples:* [Colorado Mesa University](#), [Weber State University](#), [Skidmore College](#), [Carleton College](#), and [Smith College](#).

**Communities and developers** are seeing the value of installing these networks.

- *Examples:* [Whisper Valley](#) in Texas, [Springwater Mattamy Homes](#) in Canada, and [West Union, Iowa](#).

### Non-Utility Feasibility Studies

**State and federal research and support for exploring TENs is growing.**

- This year the [Department of Energy](#) is awarding \$13 million in federal grants to 11 communities across 10 states to explore geothermal systems.
- [New York State Energy Research and Development Authority \(NYSERDA\)](#) has awarded over 35 grants for thermal energy network feasibility studies in the state.
- [The Massachusetts Clean Energy Center](#) in collaboration with [HEET](#) will be funding up to 10 projects to explore how networked geothermal systems could be installed in communities across the Commonwealth.

## NEXT STEPS & RESOURCES

What is most exciting about TENs is perhaps not even the technology itself. Rather, it is the ability of TENs to draw together stakeholders from environmental justice communities, organized labor, gas utilities, environmental organizations, legislators, regulators, industry, and many others that makes this approach such an exciting prospect for equitably decarbonizing entire communities.

If you are interested in advocating for TENs, you can learn more at: BDC's [TEN Resource Module](#) or by contacting Ania Camargo, Thermal Energy Networks, Sr. Mgr: [acamargo@buildingdecarb.org](mailto:acamargo@buildingdecarb.org)