

Testimony in Support of LD 16919, Resolve, to Establish a Commission to Study Pathways for Creating a Thermal Energy Networks Program in Maine

Senator Lawrence, Representative Sachs, and Honorable Members of the Committee on Energy, Utility and Technology, my name is Miles Ingraham, and I live in South Portland. I am an Associate Engineer at Buro Happold, a global engineering firm that has years of experience designing thermal energy networks.

What are Thermal Energy Networks?

Thermal Energy Networks (TENs) provide heating and cooling to buildings through interconnected heat pumps that move thermal energy from geothermal borefields or other thermal resources through a network of pipes via water or other refrigerants to provide non-combusting heating and cooling. They consist of heat sources and reservoirs including the ground, waste heat from commercial or industrial facilities, and thermal energy storage systems. A closed loop of pipes runs through rights-of-way, similar to existing utilities, and leads to buildings where the constant flow of heat is used to "step up" the building temperature in the winter, or "step down" the temperature in summer.

TENs are the latest generation of district energy networks, a type of energy distribution system that has been around for over a century that traditionally used a central plant with distribution lines on campuses or within towns and cities. Modern TENs operate differently than past generations in that they utilize distributed energy resources unlike a central boiler plant, making them flexible, adaptable, expandable, and discrete.

What are the benefits of Thermal Energy Networks?

Below are several of the many benefits TENs offer individuals and businesses.

- **Homeowners, businesses, and industry**
 - Lower heating and cooling costs for customers
 - Improved air quality and eliminated risk of contamination
 - Potential revenue streams for commercial and industrial facilities with waste heat resources
- **Utility companies**
 - Provide an additional service offering within their operating territories
 - Deferred or avoided grid upgrade costs
- **Non-participants**
 - TENs improve the resilience of the electric grid at large by reducing baseload and peak consumption, lowering costs for all
 - Improve local air quality by limiting combustion of fuel
 - Reduce causes and impacts of climate change

Why do we need Thermal Energy Networks in Maine?

We have learned through our own studies and those from national labs that cold and humid climates stand to benefit most from these systems. Extreme weather events can stress the local power grid, especially during peak winter heating periods where electric resistance heating and air-source heat pumps are operating at full capacity. These systems can be engineered to operate during power outages, further benefiting customers in Maine where power outages coincide with extreme weather events. Maine is also starting to experience increased frequency and magnitude of heat waves during the summer. By offering TENs as an alternative energy resource, more Mainers will also have access to cooling in the summer.

Not only are these systems efficient and provide a decarbonized heating and cooling resource for buildings, but they also save customers and utilities money over their lifecycle. Customers stand to benefit most from these systems, as heat pumps in homes utilize relatively low amounts of electricity compared to other electrified systems and combustion-based systems. It is expected that the electric grid across the country will require hundreds of billions of dollars of investment in the coming decades. By deferring or avoiding these costs through smart electrification solutions, utility companies in Maine can do more with the existing infrastructure and pass savings on to customers.

Mainers stand to benefit from the rollout of TENs by expanding heat pump adoption in which Maine already excels, further capitalizing on existing workforce and leadership in this area. These benefits can all be realized in addition to accomplishing Maine's ambitious climate goals.

If you have further questions on the feasibility, engineering, operations, or economics of these systems, I have left my contact information below.

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