



Jim Zolnierek
Bureau Chief, Public Utilities
Illinois Commerce Commission
527 E. Capitol Ave.
Springfield, IL 62701

January 31, 2024

Re: Thermal Energy Network Final Comments of Advanced Energy United

Dear Mr. Zolnierek,

I. Introduction

Advanced Energy United respectfully submits these comments in the Illinois Commerce Commission's (ICC) Thermal Energy Network (TEN) forum. Advanced Energy United is an industry association that educates and advocates for policies that allow our member companies to compete to repower our economy with 100% clean, reliable, and affordable energy. We represent over 100 businesses working across the energy sector, including large-scale and distributed renewables, geothermal, energy storage, energy efficiency, software and service providers, transmission and distribution developers, electric vehicle manufacturers, fleet operators, charging infrastructure providers, and more. Our Advanced Energy Buyers Group also represents large energy users looking to repower their operations with clean energy and transportation.

The decarbonization of buildings represents one of the most difficult challenges of our time. As technology, market, and policy trends drive towards a future with vastly different infrastructure needs, TENs will undoubtedly be part of the solution. We appreciate the ICC's work to proactively address some of the regulatory questions related to TENs, and these comments provide general support for further progress towards turning TENs into a staple of Illinois' energy system.

Our comments are organized into the following points:

- **TENs are a very attractive replacement for fossil fuel use in buildings**
- **TENs are a “grid-ready” electrification solution**
- **TENs offer a new way forward for gas utilities and gas utility workers**
- **TENs are a proven technology being actively piloted in several states. Initial projects in Illinois should be scoped to create data and experience within different business models and regulatory constructs.**
- **Illinois should move forward with TEN projects while there are federal incentives available to lower utility or state costs for relevant neighborhood-scale projects.**
- **Recommendations**

II. TENs are a very attractive replacement for fossil fuel use in buildings

TENs are an attractive new resource to heat and cool Illinois buildings using clean, renewable and efficient energy sourced directly from the earth beneath our feet. Especially as they replace the transport and combustion of fossil fuel natural gas in homes and businesses, TENs will lower Illinois emissions and improve local indoor and outdoor air quality. Insofar as the regulatory structure for these TENs is designed and located intentionally, TENs are likely to increase heating and cooling affordability. Aside from their upfront capital costs, transported thermal energy should have low- to no- marginal cost.

Importantly, investment in TENs should either entirely replace the need for gas pipelines in their geography or be designed to entirely replace gas pipelines in their geography within a few years after deployment. The primary financial benefits to both TEN program participants and non-TEN program participants will be the *substitution* of capital and operational expenditures associated with a long-lived fossil fuel asset with diminishing usefulness and increasing incompatibility with state policy for the capital and operational expenditures associated with a long-lived more efficient renewable energy asset that helps further Illinois’ climate goals. The construction, operation, and maintenance of both gas service and TENs is also unnecessary for reliability, even during Illinois’ coldest weather – TENs themselves do not need gas pipeline



backup given their natural ability to reliably serve their customers based on a consistent, year-round ground temperature.

In this way, we respectfully disagree with participants in the workshops who seek to retain two duplicative systems of expensive infrastructure, with both systems charged to all or some ratepayers. However, if a TEN cannot replace all gas end-uses in its buildings immediately upon construction, gas service in the TEN territory may be sustained so long as there is an understanding that no more non-emergency investment should be made to the pipeline infrastructure in that area.

In sum, Advanced Energy United supports a finding by the ICC that TENs can further climate justice, emissions reductions, and benefits to utility customers and society at large, especially related to public health and affordability (Objective 3).

III. TENs are a “grid-ready” electrification solution

Air Source heat pumps, mini-split heat pumps, heat pump water heaters and heat pump dryers are poised to see strong uptake across the U.S., due to market trends, technology innovation, and federal, state, and local incentives and policies. However, while significantly more efficient than traditional gas furnaces and electric resistance heating technologies (and likely to lower electricity demand during summer peaks), air source technologies do become less efficient at especially cold temperatures. Those cold temperatures may then cause increased electric load at some of the most challenging hours of the year – cold morning winter peaks.

As a complementary technology, ground-source (or geothermal) heat pumps are perhaps the most energy-efficient heating and cooling systems available, especially when part of a networked system. Because they do not lose as much efficiency at cold temperatures, the electric grid will not have to build up to serve a much higher winter peak. A new study by Oak Ridge National Laboratory and National Renewable Energy Laboratory found that if approximately 70% of buildings in the country were retrofitted with ground source heat pumps and building envelope improvements, electric demand would be 13% lower (with 24,500



fewer miles of transmission needed) compared to decarbonization without geothermal heat pumps. These results translate into billions of dollars of savings for energy customers, on the order of \$19 billion per year by 2050.¹ Of note, these figures do not consider additional efficiencies of networked geothermal systems.

The study concludes:

Because GHPs [geothermal heat pumps] reduce the cost of power on the grid, as well as the marginal system cost of electricity, which, combined with reduced fuel consumption, reduces consumer energy payments, GHPs are valuable for potentially achieving economic and environmental justice in underserved communities. Because less grid infrastructure investment is required with the large-scale deployment of GHPs, they could reduce the cost of power for all grid consumers—even those who do not have the technology installed.

Illinois does not have to reach 70% penetration of geothermal heating and cooling to realize savings – the benefits of the technology should scale with deployment. As such, TENs, as promoted by the Illinois legislature, the ICC, gas utilities and third-party providers, are a scalable way to deploy cost-saving geothermal resources in the state.

IV. TENs offer a new way forward for gas utilities and gas utility workers

The ICC has already recognized that the current gas utility business model – to deliver a fossil fuel through long-lived pipeline infrastructure – cannot continue indefinitely under Illinois’ climate and clean energy commitments.² It is also threatened by market forces, including competition from high-performing, non-combustion clean appliances and rising and volatile costs of natural gas and natural gas infrastructure.

¹ Oak Ridge National Laboratory, *Grid Cost and Total Emissions Reductions Through Mass Deployment of Geothermal Heat Pumps for Building Heating and Cooling Electrification in the United States*. November 2023. Available at: <https://info.ornl.gov/sites/publications/Files/Pub196793.pdf>

² “If the decarbonization goals of CEJA are to be met, the gas distribution system as currently operated will need to change.” ICC Docket No. 23-0066, November 16, 2023 Order, p233; ICC Docket No. 23-0067, November 16, 2023 Order, p93; ICC Docket Nos. 23-0068/23-0069 (Cons.), November 16, 2023 Order, p121.



While some pipeline fuels, such as renewable natural gas and clean hydrogen, may serve some of the current heating load (most likely in the hard-to-electrify sectors), all “alternative fuels” have drawbacks with respect to residential use. These drawbacks include technical and economic potential and pipeline and appliance compatibility. As such, gas utilities need to innovate to provide clean thermal energy or energy to a narrower customer base (i.e., high-temperature industrial customers). TENs are a great new solution that leverage the gas utility’s unique skillset and workforce, including pipefitters.

That said, Advanced Energy United does not believe that the ICC should, at this time, limit the development of TENs to regulated utilities. At this early stage of deployment, United recommends that the state implement several different models of ownership to see what service can provide customers with the most affordable service. This can best be done by soliciting projects via a competitive Request for Proposals (RFP) wherein the utility bids in on a level playing field, to be refereed by an independent evaluator. However, gas utilities have a natural leg up in this space, and we look forward to seeing how they integrate it into a clean energy business model moving forward.

V. TENs are a proven technology being actively piloted in several states. Initial projects in Illinois should be scoped to create data and experience within different business models and regulatory constructs.

Thermal energy networks are a proven technology, relied upon extensively in Europe and on campuses. The TEN at Colorado Mesa University was built in 2008 and creates \$1.5 million in annual energy savings.³ Eversource and National Grid, two northeastern utilities, are currently developing TEN projects in Framingham and Lowell, Massachusetts. New York has seen 21 proposals for TENs to date. Weber State University’s networked geothermal in Utah has been in operation for over 10 years. Marquette University in Wisconsin and the City of Philadelphia, Pennsylvania are conducting feasibility studies.⁴

³ Information available at: <https://www.coloradomesa.edu/sustainability/initiatives/geo-grid.html>

⁴ HEET, Networked Geothermal: The National Picture. Available at: <https://heet.org/2023/04/17/networked-geothermal-the-national-picture/>



Advanced Energy United does not believe that Illinois needs to “pilot” the TEN technology to prove its capabilities or benefits at a high level. Instead, United recommends that Illinois use this initial stage of TEN development to understand the pros- and cons- of different business models, ownership structures, rate structures, deployment methods, etc. Given that the ICC has noted the lack of consensus on the details of TEN deployment by participants in the TEN workshops, we suggest that the ICC offer an RFP that allows for all TEN models and lets applicants figure out proposed structures, the best way to capitalize on federal tax credits and rebate programs, workforce composition, and any other outstanding questions that the ICC has not yet resolved after this TEN Forum. The ICC could then evaluate and select proposals based on select criteria, such as: 1) impact to participating and non-participating ratepayers, 2) impact on the gas utility workforce, 3) ability to further the state’s policy goals, and 4) ability to provide data and/or scale. After several projects have been implemented, the ICC can further determine any preferences to be expressed via regulation on TENs according to its experiences.

VI. Illinois should move forward with TEN projects while there are federal incentives available to lower utility or state costs for relevant neighborhood-scale projects.

Objective 2 of the TEN Forums is to: “Consider project designs that could maximize the value of existing state energy efficiency and weatherization programs and maximize federal funding opportunities to the extent practicable.” With this in mind, Advanced Energy United recommends moving quickly to develop projects that can leverage available federal funding streams. To the extent that the developers of TENs, homeowners, businesses, or public buildings can take advantage of federal rebates and tax credits, the upfront cost of these projects will look more attractive. Moreover, if TEN projects can be coordinated or stacked with other rebates and incentives for home energy efficiency and distributed energy resource projects, the program participants are likely to experience even greater savings. More funding and benefits may be made available for Illinois’ most vulnerable residents via programs like the Home Efficiency Rebates and Home Electrification and Appliance Rebates if the ICC and interested localities and utilities coordinate their TEN projects with the state’s energy office.



VII. Recommendations

As the ICC prepares its report for the Governor and General Assembly, Advanced Energy United encourages the ICC to bear the above thoughts in mind and recommend that it implement initial TEN projects in accordance with the following:

- **Thermal Energy Networks will be an asset to Illinois' decarbonization and clean heat efforts, with benefits to participating customers, the gas utility, the gas utility workforce, the electric grid, electric ratepayers, and the public at large. The ICC should initiate the expeditious deployment of several initial TENs using a competitive RFP (allowing utilities to fairly compete) in order to explore different regulatory and ownership frameworks for their public benefits.**
- **The ICC should select projects from the RFP that leverage additional federal incentive programs, create good jobs, promote energy justice, generate good data, provide scalability, offer participating customers lower rates, and do no harm to non-participating customers.**
- **The ICC should coordinate with the state energy office to the extent that it would like to leverage near-term home efficiency and electrification rebates to lower the cost of these initial TEN projects.**
- **After sufficient experience following TENs deployment, the ICC should develop a more permanent regulatory framework for future TENs that maximizes public benefits.**

VIII. Conclusion

We appreciate the opportunity to contribute to this important and timely policy conversation. Please do not hesitate to contact us if you would like to discuss any of Advanced Energy United's recommendations.



Signed,

John Albers, Policy Director

Advanced Energy United

Sarah Steinberg, Policy Director

Advanced Energy United

