Building Decarbonization Coalition • Geothermal Exchange Organization • NY GEO
International Ground Source Heat Pump Association • Brightcore Energy LLC • Salas O'Brien
Buro Happold • SHARC Energy • Johnson Controls • Egg Geo, LLC • RUHL TecDesign LLC
Aztech Geothermal LLC • Bright Power, Inc. • Climate Control Group • Enertech USA
Ecosystem Energy Services • TENS.NYC • Goldman Copeland Consulting Engineers
New York League of Conservation Voters • Alliance for a Green Economy (AGREE) • HEET

VIA ONLINE SUBMISSION **October 6, 2025**

State Energy Plan Comments
NYSERDA
17 Columbia Circle
Albany, NY, 12203-6399

Re: New York State Energy Plan - Comments on the Thermal Energy Network recommendations contained in the Buildings Chapter

On behalf of leading organizations and companies in the HVAC and geothermal industries and clean energy innovation sectors, we respectfully submit these comments on the Thermal Energy Network (TEN) recommendations in the Draft 2025 New York State Energy Plan.

New York has successfully led the nation on TENs policy. In 2022, the State legislature passed and Governor Hochul signed the Utility Thermal Energy Network and Jobs Act (UTENJA), boldly advancing a neighborhood-scale solution that reduces grid costs, avoids gas infrastructure spending, supports good jobs, and delivers affordable, reliable clean energy. By implementing the recommendations below — including developing a regulatory framework guided by fair market principles for TENs as the precursor to creating thermal utilities, supporting municipalities in pursuing high-value TENs, and rapidly advancing waste heat recovery and thermal storage policies — the State can and will continue to lead on TENs implementation.

We urge the State to prioritize the necessary resources and agency staffing to implement these ambitious, yet achievable and essential, recommendations, and help deliver a clean, resilient, and reliable energy future to New Yorkers.

Background

Thermal energy networks (TENs) are hyper-efficient systems that heat and cool buildings and reduce demand on the electric grid by moving thermal energy to and from buildings and thermal energy sources and sinks. They have multiple design possibilities that allow for different types of sources and sinks of thermal energy including geothermal, bodies of water, waste heat from buildings and industrial processes, wastewater energy transfer and wastewater heat recovery. TENs can be designed entirely fossil fuel free and are a major tool in the toolkit to achieve building and neighborhood-scale decarbonization. There are significant benefits to utilizing TENs across New York State.

Demand reduction: TENs are capable of reducing the overall energy use of the building as well as peaking electric demand for heating and cooling, when compared to traditional air conditioners or air-source heat pumps.

Energy storage: By incorporating thermal energy storage, either utilizing standalone cooling/heating storage or just the thermal mass of an ambient TEN loop, utilizing a variety of thermal energy sinks and sources, TENs can deliver thermal energy to customer heat pumps to optimize performance. This approach requires significantly less consideration of outdoor air temperatures than optimizing with air source heat pumps. Other building electrification approaches include systems where the energy performance of the thermal and electric grid degrades during times of peak energy use and under extreme outdoor conditions. On-site building electrification strategies can also utilize thermal storage, but typically have limited available space to fully leverage in retrofit applications. TENs offer an alternative approach to building electrification that efficiently mitigates the impact of end-use customer electric demand on the grid, particularly during the winter and summer seasons, and especially under extreme conditions. Many TENs include thermal energy storage systems located outside of the buildings boundaries that store heat or cold energy when electricity demand is low and release it when demand is high. This can function similarly to battery storage for electricity, shifting energy consumption away from peak periods. Since thermal energy storage can reduce the need for electric heating or cooling at times when the grid is most stressed, it can function as a dispatchable resource for electric capacity. By providing stored thermal energy at the right time,

TENs can be considered part of the electric grid's capacity mix, thereby optimizing each of the generation, transmission and distribution functions.

Grid costs: A 2023 Department of Energy (USDOE) Oak Ridge National Laboratory report[1] and NYSERDA's own 2022 Carbon Neutral Buildings Roadmap[2] highlight the important role that ground source heat pumps (and by extension TENs) can play in decarbonizing buildings, reducing the need for new electricity generation and transmission infrastructure, and enabling energy savings for customers. According to the USDOE report, broad ground source heat pump adoption would result in cumulative savings to the U.S. economy of more than $1 trillion by 2050, eliminate the need for 24,500 miles of transmission lines, decrease required electricity generation by 13 percent, and reduce carbon dioxide emission by more than 7,300 million metric tons. USDOE continues its research into TENs and the infrastructure's ability to manage grid capacity, particularly through its 'Connected Communities' program in partnership with other national laboratories and various regulated utilities. The NYSERDA report foresees $90 billion of savings in generation and transmission expenditure in New York in a managed building electrification scenario with emphasis on ground-source heat pumps and shell improvements.

Demand management: TENs offer advanced peak demand management and therefore should be included in the analysis as one of the key demand response options for the electric grid. By using stored thermal energy for space conditioning, they can lower the burden on the grid during high-demand periods, helping to avoid blackouts, the need to activate costly peaker plants and the need to otherwise over-build the electric generation, transmission, and distribution network. Other technologies can lose their ability to provide demand management as temperatures reach points at which grid demand is peaking. Under peaking outdoor temperature conditions, load diversity diminishes, along with the ability to modulate loads and reduce total controlled peaks. However, TENs' ability to modulate loads of connected heat pumps is maintained even under

[1]Oak Ridge National Laboratory, *ORNL Study Projects Geothermal Heat Pumps' Impact on Carbon Emissions and Electrical Grid by 2050*, February 14, 2024. *See*: https://www.ornl.gov/news/ornl-study-projects-geothermal-heat-pumps-impact-carbon-emissions-and-electrical-grid-2050 (last accessed October 6, 2025).
[2]NYSERDA, *New York's Carbon Neutral Buildings Roadmap*, December 2022. *See*: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Carbon-Neutral-Buildings/carbon-neutral-buildings-roadmap.pdf.

grid peaking conditions. Electrification will exacerbate grid peaking conditions, and TENs can provide needed demand management capabilities in a way that other technologies cannot.

Avoided cost of gas infrastructure: The cost of repairing and replacing aging gas infrastructure is extremely high. Instead of investing in gas lines, which are in conflict with the emissions reduction targets and requirements of the CLCPA and which will eventually be stranded assets, utilities can repurpose funds toward more sustainable solutions, including TENs to decarbonize heating and cooling. These actions will better align New York with its climate goals, support grid resilience, and reduce long term energy costs, while supporting local job creation and boosting health benefits.

State Progress

Governor Hochul's Executive Order No. 22 of 2022 set the stage for State decarbonization progress by making a commitment to 'leading by example' with state-owned facilities.[3] Since this executive order, the State has made significant commitments to decarbonizing its multi building facilities through thermal energy networks. In the FY 2024 Enacted State Budget, the New York Power Authority (NYPA) was authorized and directed to develop decarbonization action plans for 15 of the highest emitting State facilities utilizing thermal energy networks.[4] Additionally, the budget provided $30 million for the University at Albany—SUNY to replace two fossil-fuel-fired chillers with a high efficiency electric chiller and a heat recovery/heat pump chiller.

In 2022, Governor Hochul signed the Utility Thermal Energy Networks and Jobs Act, which authorizes and mandates each of the seven major investor-owned utilities to pilot thermal energy networks in their territories. This law is currently being implemented by the Public Service Commission, as pilot projects are being reviewed for approval to construction.

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[3]N.Y. State Exec. Order No. 22, "*Leading by Example: Directing State Agencies to Adopt a Sustainability and Decarbonization Program,*" (September 20, 2022). *See*: https://www.governor.ny.gov/executive-order/no-22-leading-example-directing-state-agencies-adopt-sustainability-and.

[4]N.Y. State, "*Governor Hochul Announces Decarbonization Leadership Program*," press release, October 10, 2023. *See*: https://www.governor.ny.gov/news/governor-hochul-announces-decarbonization-leadership-program-reduce-carbon-emissions-state.

In the FY 2026 Enacted State Budget, the state prioritized investment in building decarbonization by including $200 million for modern, zero-emission TENs. This critical investment will jumpstart several shovel-ready projects at SUNY and CUNY campuses and support the decarbonization and expansion of municipal energy systems, like Jamestown's aging district steam system.

New York has already made nation-leading progress on supporting the development of thermal energy networks, but to realize the true potential of TENs as part of the State's decarbonization solution, they should be incorporated throughout the State Energy Plan.

Federal Support

Federal budget reconciliation legislation enacted this year made major changes to incentives for a wide range of clean energy technologies. While the Residential Clean Energy Credit for single family homeowners (Section 25D) is being eliminated at the end of this year, Congress left the commercial Investment Tax Credit for Geothermal Heat Pump Properties (Section 48) untouched. TENs are eligible for a 30% tax credit for project costs with additional bonus credits of 10% for domestic content and 10% for systems located in energy communities. Direct payments of the credit are available for non-taxable entities including state and municipal government entities. These credits are available at their current levels until 2033 when they begin stepping down before phasing out completely in 2035.

In addition to preserving the commercial geothermal heat pump incentives of the Inflation Reduction Act, Congress added new statutory language designed to spur geothermal heat pump deployment. The first provision grants geothermal systems an exemption from a longstanding IRS leasing policy known as "limited use property doctrine." Prior to this provision, commercial entities were prohibited from leasing geothermal systems to building owners. Third-party ownership lease models rapidly accelerated adoption of solar systems and now the same approach can be leveraged to advance geothermal.

The second new provision instated by Congress was an expansion of eligible technologies for ownership under master limited partnerships. MLPs are a common ownership structure in the oil and gas industry and provide significant tax advantages by allowing pass-through of profits directly to shareholders. A MLP-owned TEN could take advantage of ITC incentives and enjoy additional tax benefits due to the business structure. The continued federal support for TENs is a testament to the bipartisan desire to see the technology proliferate and deliver benefits to Americans and the nation's electric grid.

State Energy Plan Proposals

The 2025 New York State Energy Plan Draft incorporates several proposals that would support the development of thermal energy networks. Below are our comments on the proposed initiatives.

Roadmap

"NYSERDA, DPS, and other relevant State actors should develop a Thermal Energy Network Roadmap for New York State that lays out the market barriers currently facing TENs development in NYS, while identifying a set of holistic solutions in the near and mid-term to address these barriers. This Roadmap should be informed by experiences in Europe, Canada, and jurisdictions in the United States."[5]

This is a critical step for the State to take. To ensure that the roadmap is as effective as possible, it is important to include a wide range of stakeholders and a wide range of business models in its development for both upstate and downstate regions. Stakeholders, including organized labor, consumer protection advocates, environmental advocates, environmental justice advocates, the buildings and real estate development industry, thermal energy networks experts, economic development experts, infrastructure development and finance industry members, potential waste heat providers such as municipal wastewater authorities, transportation systems, data center owners, and manufacturers, and other energy experts should be regularly and consistently

[5] NYSERDA, "Draft New York State Energy Plan, Chapter 8: Buildings," July 25, 2025, https://energyplan.ny.gov/Plans/Draft-2025-Energy-Plan.

consulted in this work. We propose including an official TENs Working Group to consult relevant state agencies and advise on content of the Roadmap. This work is truly innovative and would benefit from a wide range of stakeholder input and diverse perspectives. We highly recommend that this work be done transparently and in coalition with interested organizations.

The roadmap should incorporate several considerations: the use of thermal storage; access to public spaces and coordination with agencies (e.g. wastewater treatment authorities, MTA); supply chain issues; public-private partnerships; cost sharing; and low-cost financing. Neighborhood-scale geothermal systems, like non-networked geothermal heating and cooling at scale, offer a complementary solution for decarbonizing new residential construction that can mitigate grid costs and support achievement of New York's climate goals and should be considered alongside TENs in the roadmap. Individualized systems are viable and desirable under various site-specific conditions, particularly for communities and neighborhoods at lower density and insufficient load diversity.

Analysis of TENs and Grid Benefits

"*NYSERDA, in coordination with DPS, should advance analysis of TENs. Topics for study should include geospatial analysis to identify areas of the state that may be most viable for thermal energy networks (based on proximity of thermal demand and available thermal resources) and improve public access to thermal resource data…Analysis should further and also help to understand the impacts, benefits, and tradeoffs for the energy system of investing in TENs versus standalone building decarbonization strategies.*"

"*DOS, NYSERDA, and other State actors should continue to develop standards for flexible load capabilities for other equipment and building types."*

"*The PSC/DPS and NYISO should consider opportunities to expand utility demand response programs, adapting them to enable mass-market participation and support load flexibility at scale.*"

TENs can have considerable positive impacts on the electric grid. It is crucial to properly evaluate the impacts, benefits and tradeoffs of investing in NPAs, including TENs and other neighborhood scale decarbonization, as well as standalone building decarbonization.[6]

TENs, particularly when integrated with thermal storage and demand response systems, can indeed provide direct electric capacity resources by contributing to grid stability, reducing demand during peak periods, and serving as dispatchable resources. The key is to understand that capacity is not just about generating electricity but about ensuring the grid can meet demand, whether through generation or demand reduction. This broader definition of capacity aligns well with state planning processes, such as the Grid of the Future proceeding, and the role that TENs can play in the modern energy ecosystem.[7]

Additionally, there are many considerations when determining which neighborhood scale approach is most beneficial to a particular project or area. Buro Happold has built an excel-based cost modeling tool to assist in understanding where TENs would be most beneficial when comparing TENs to air-source heat pump (ASHP) strategies in the United States. Buro Happold's Optimal Scenarios for TENs Study found several key benefits of TENs in supporting New York's electrification goals, including reducing strain on the electric grid, which can reduce utility costs and emissions, particularly in colder and more humid climates; offering a more equitable and scalable approach to electrification; and a unique strategic opportunity to support a just transition for workers into high-quality jobs in pipefitting, geothermal drilling, and clean energy infrastructure, in addition to offering benefits to ratepayers by providing a viable alternative for utilities to increasingly risky and expensive investments in aging gas systems.[8]

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[6] Buro Happold, *Grids of the Future Harness Thermal Energy to Work Across the Meter and Effectively Manage Demand*. December 2024. *See filing in* Case 24-E-0165, *Proceeding on Motion of the Commission Regarding the Grid of the Future*, N.Y. Public Service Commission, March 26, 2025: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={4086D395-0000-C010-9C55-DBB2B5B6D41B}.

[7] Building Decarbonization Coalition, *et. al.*, Filing, Filed in Case 24-E-0165, N.Y. Public Service Commission, November 11, 2024. *See*: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C0B62093-0000-CA1C-B1BA-F59D007F88BE}.

[8] Buro Happold, *Optimal Scenarios for Thermal Energy Networks*, September 12, 2025. Filed in Case 22-M-0429, N.Y. Public Service Commission, September 22, 2025. *See*: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={F0C47199-0000-C12C-883E-291B53BD19AC}.

Resource Efficient Decarbonization

Use Resource Efficient Decarbonization (RED) strategies including strategic thermal energy network, wastewater energy transfer and thermal energy storage deployment to avoid peak demand growth.

Regulatory Framework

"*The PSC should continue to develop the regulatory framework for TENs in a manner that provides increased market understanding and certainty as to what regulations will be required and for which types of systems. This is especially integral for multi-user (non-campus) TENs.*"

On July 5, 2022, Governor Hochul signed the Utility Thermal Energy Network and Jobs Act (UTENJA) into law. UTENJA requires the Commission to "create fair market access rules for utility-owned thermal energy networks to accept thermal energy that aligns with the climate justice and greenhouse gas emissions reductions requirements of the Climate Leadership and Community Protection Act (CLCPA) and that does not increase greenhouse gas emissions or co-pollutants" (PSL §66-t(1)(a)).

The TENs regulatory framework will be necessary to provide market certainty and to ultimately scale these systems. It is critically important to establish a basic regulatory framework that will ultimately define how, in the future, a diverse set of parties will interact with the thermal energy network, its operators, its suppliers and its customers and how each of these parties will assume their role. The iterative nature of developing the framework is worth noting. The framework can and should be continually updated and refined as best practices are identified and lessons are learned from the pilot projects.

The principles and functionality of an efficient thermal energy market should drive the development of the regulatory framework and deliver value propositions. A market design framework is necessary to inform the regulatory proceeding. Defining roles and functions for market actors is needed to best contemplate the rules necessary to govern the thermal marketplace. The State needs to immediately advance the UTENJA pilots and in parallel begin a

rigorous process to align stakeholders around core market principles, market design and a regulatory framework. Once learnings come in and efforts are made to engage a diverse set of stakeholders and work toward alignment, then a robust discussion on system design and specific technologies can be had in a more productive way.

A regulatory and functional system framework is necessary to unlock a thermal sector marketplace in New York so that appropriate technologies are applied in the appropriate context. Several attributes of market design, regulatory frameworks, market actors and physical functionality should be integrated into a regulatory framework. It is unnecessary for all of these attributes to be present, but important to note they are all interconnectable and interoperable in order to provide least cost and fully-optimized thermal energy infrastructure. Core regulatory principles must at least include:

- Regulatory classification and rules for IOU and non-IOU TENs owners and operators.
- Transparent accounting, cost, engineering data and design.
- Non-discriminatory connections for customers and Thermal Energy Resource providers.
- Many different Thermal Energy Resources.
- System interconnectability, interoperability, quality and reliability.
- Optimization and efficiency.
- Standardized pricing.
- Market competition.
- Franchise opportunities.
- Public-private partnerships.
- Shared financing between multiple ownership entities.

We will continue working with and aligning key stakeholders and market actors to further refine and define regulatory principles and frameworks to support the development of a New York State thermal energy marketplace.

Support for Municipal and Community TENs

"NYSERDA, DPS, and other State actors should explore the role of area-based thermal energy planning and resources that support municipalities and communities to identify locations with high potential and local support for TENs."

Supporting municipalities and communities in identifying high-value TENs projects is worthwhile. The State should evaluate how likely the projects are to move forward and focus on supporting projects that are likely to move past the feasibility study phase. We recommend that the State outline a strategy to finance these projects in order to get them beyond the feasibility phase. The state should consider a diversity of ownership models. For example, a municipality project could partner with utilities, or include public/private financing models, or incorporate new TENs related activities into existing municipal utility or local economic development practices.

Additionally, we would discourage introducing a new term or phrase "area-based thermal energy planning" to describe this work. Rather, it would be more helpful to describe how this fits into existing municipal and economic development planning procedures. The urban planning industry should be engaged to identify knowledge gaps and define best practices relating to this work.

Additional Proposals

Below are proposals that have not yet been included in the State Energy Plan, but that would be helpful in scaling thermal energy networks and we recommend including them in the final Plan.

Waste Heat Recovery

Heat that would otherwise be emitted from buildings can be a valuable resource. TENs can help ensure that the excess heat created from data centers (and other 24/7 cooling systems), wastewater treatment plants, and industrial processes is not wasted and instead redistributed in the form of usable thermal energy for buildings.

TENs are designed to use the heat resources of a location, and waste heat from a data center is a valuable resource: it is recoverable and, because data centers function 24/7, it is constant. Integrating a data center into a TEN thus transforms data centers from isolated energy consumers into active contributors to a community's energy ecosystem. Community resources like wastewater treatment plants are not likely to be removed, and therefore a good entity to rely on for continued heat in a TEN. Other industrial processes should be considered carefully before being utilized, ensuring that connecting to a TEN isn't keeping an outdated process that is otherwise high-polluting in operation.

Using waste heat resources can reduce the total cost of the thermal energy network by reducing the number of boreholes necessary to balance the system. It can also reduce emissions and save water by reducing the number of cooling towers that would otherwise be necessary to reject heat. Additionally, for energy-intensive operations like data centers, using the waste heat makes it much more beneficial for the community it is placed in by reducing noise, saving water, and reducing strain on the electric grid.[9]

The State should determine near-term waste heat policy pathways through incentives and requirements for "thermal readiness" for new waste resources and/or by determining ways to regulate waste heat emissions by mandating that when possible, heat that would otherwise be wasted should be used in a TEN.

One such pathway could promote proactive market transformation policies that require "thermal readiness" for new waste heat resources by identifying and implementing policy incentives to encourage existing waste heat resources to either participate or serve as anchor thermal sources for future TENs.

The New York State Department of Environmental Conservation (DEC) could consider regulating new waste heat resources of significant size, similar to the *German Energy Efficiency Act*. A fee for large waste heat emitters would be required and the fee would then be waived if

[9] Ashley Besic, *Can Data Centers Heat Our Buildings? Using Thermal Energy Networks to Reuse Data Center Waste Heat* (Building Decarbonization Coalition, July 2025). *See:* https://buildingdecarb.org/resource/tens-data-centers.

waste heat is captured and used in TENs or in a single building. This would allow for heat recovery at the facilities that would otherwise reject the most heat (data centers, wastewater treatment plants, industrial processes). This can save money for industries that generate significant waste heat, provide lower cost heat for adjacent heat users, and provide a path to large-scale decarbonization if waste heat feeds thermal energy networks.

Thermal Energy Storage

New York State has a nation-leading battery storage goal of six gigawatts of energy storage by 2030, which represents at least 20 percent of the peak electricity load of New York State.[10] The State estimates that this goal will support a buildout of storage deployments estimated to reduce projected future statewide electric system costs by nearly $2 billion, in addition to further benefits in the form of improved public health because of reduced exposure to harmful fossil fuel pollutants.

The progress that has been made with battery storage should be expanded to thermal storage. Thermal energy storage systems store intermittent heat through underground geologic reservoirs via boreholes or above-ground storage tanks and distribute that stored energy when needed in the system. By having the ability to recall and redistribute stored thermal mass through the network, TENs can temporally disaggregate the need for thermal energy with otherwise high periods of electrical demand.

The State's battery storage goal should be at least doubled to twelve gigawatts, with a requirement that half of this goal be met through investment in thermal energy storage. Alternatively, given the immense potential, the State could set an ambitious 20 gigawatt thermal energy storage goal to be achieved by 2030. This will help use lower cost and increase energy storage capacity, at potentially longer durations, to improve grid utilization. It will also increase the avoided costs of electric system build outs from the battery storage goal and further improve public health.

[10]NYSERDA, "*Approval of New York's Nation-Leading Six Gigawatt Energy Storage Roadmap Announced*," June 20, 2024. *See*: https://www.nyserda.ny.gov/About/Newsroom/2024-Announcements/2024_06_20-Governor-Hochul-Announces-Approval-Of-New-Yorks-Nation-Leading.

Conclusion

We applaud the State's leadership as a TENs innovator, and the proposals in the State Energy Plan reflect that. With consideration for our recommendations, including the current and additional proposals, New York can continue its leadership in building and scaling thermal energy networks and thermal storage as an effective decarbonization tool that promotes long-term energy affordability, sustainable jobs, and effective demand management.

We look forward to working with the State on the Thermal Energy Network roadmap and to identify and address barriers to scale the thermal energy marketplace, help build a regulatory framework and fair market principles to scale Thermal Energy Networks and advance thermal storage and waste heat recovery policies.

Respectfully submitted,
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