November 11, 2024

Hon. Michelle L. Phillips, Secretary, New York
State Public Service Commission, Three Empire State Plaza,
Albany, New York, 12223-1350

Dear Hon. Michelle L Phillips,

The undersigned organizations applaud the State of New York Public Service Commission and Department of Public Service staff for initiating the 'Grid of the Future' proceeding (case 24-E-0165) to determine the viability of delivering additional upstream and downstream capacity through the deployment of flexible capacity resources. We are writing to express our concerns about the possible exclusion of consideration of a key technology that could play a significant role in shaping the average and peak electricity demand profile in New York State.

As we understand it, a study conducted by the Brattle Group will serve as a basis for the State's understanding of how costs may be contained as electric grid capacity needs grow to meet increasing demand from industry and transportation and buildings electrification. We are concerned that the study scope does not include thermal energy networks (TENs) as one of the resources/technologies analyzed. For the following reasons, we request their inclusion in the study being conducted by Brattle Group, or, in the alternative, in a separate study to inform the Grid of the Future proceeding.

Demand reduction: Thermal energy networks are hyper-efficient systems that move 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. TENs can be designed entirely fossil fuel free and are a major tool in the toolkit to achieve building and neighborhood-scale decarbonization. Significant to the Grid of the Future proceeding, TENs are capable of reducing the overall as well as peaking electric demand of connected electric heat pumps found on the customer side of the electric meter, when compared to traditional air conditioners or air-source heat pumps.

Energy storage: By incorporating thermal energy storage, thermal mass of the ambient loop, and a variety of thermal energy sinks and sources, TENs can deliver heat to heat pumps at temperatures that optimize their performance with much lesser consideration of outdoor air temperatures than when 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. TENs offer an alternative approach to building electrification to efficiently mitigate how end-use customer electric demand impacts the grid particularly during the winter and summer seasons, and especially under extreme conditions. Many TENs include thermal energy storage systems 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 energy at the right time, TENs can be considered part of the 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] as well as 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 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 grid peaking conditions. Electrification will exacerbate grid peaking conditions, and TENs can provide needed demand management capabilities in a way that other technologies cannot.

TENs, particularly when integrated with thermal storage and demand response systems, can indeed be argued to act as 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 the intent of the Grid of the Future proceeding and the role that TENs can play in the modern energy ecosystem.

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[1]https://www.ornl.gov/news/ornl-study-projects-geothermal-heat-pumps-impact-carbon-emissions-and-electrical-grid-2050

[2]https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Carbon-Neutral-Buildings/carbon-neutral-buildings-roadmap.pdf

In addition to our request to include TENs in the analysis that will inform this proceeding, we request the establishment of a subgroup focused on determining how thermal energy storage and integrated thermal energy networks and related infrastructure can provide grid flexibility and be incorporated into the State's Grid of the Future plan. The work should be conducted in close coordination with staff already working on Case 22-M-0429, or the Proceeding on Motion of the Commission to Implement the Requirements of the Utility Thermal Energy Network and Jobs Act (UTENJA), where deep analysis, extensive rulemaking, and ongoing discussion about the value thermal energy network (TEN) systems can deliver to the electric grid is already underway.

Thermal energy networks are grid capacity resources and should be valued as such, in the same way battery electric systems and other distributed resources are valued.

Respectfully submitted,

Building Decarbonization Coalition, Nicole Abene, Senior NY Legislative & Regulatory Manager
New York State AFL-CIO
New York State Building & Construction Trades Council
United Association of Journeymen and Apprentices
of the Plumbing and Pipe Fitting Industry, John Murphy, International Representative
Eric Walker, WE ACT for Environmental Justice, Senior Policy Manager for Energy Justice
Alliance for a Green Economy, Jessica Azulay, Executive Director
New York League of Conservation Voters, Julie Tighe, President
Sierra Club Atlantic Chapter, Roger Downs, Conservation Director
ALIGN, Theodore Moore, Executive Director
New Yorkers for Clean Power, Anshul Gupta, Policy & Research Director
Geothermal Exchange Organization, Ryan Dougherty, President
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Salas O'Brien, Brian Urlaub, Vice President and Director of Geothermal Operations
Reshape Infrastructure Strategies Ltd, Gerard MacDonald, P Eng (Non-Practising), Principal
Buro Happold, Jason Masters, Energy Lead
International District Energy Association, Robert P. Thornton, President & CEO
RUHL TecDesign LLC, Kevin Appleby, Managing Partner
WSP, Charlie Marino, Climate and Energy
Sane Energy Project, Kim Fraczek, Director
Brightcore Energy, Michael T. Richter, President
Ecosystem Energy, Adam Shelly, PE, CEM, Project Development Director
NY-GEO, Christine Hoffer, Executive Director
Bright Power, Jeffrey Perlman, Founder and Chief Strategy Officer