Nikolai Albert T. M. Wolfe
Staff Attorney | Law Department

November 30, 2023

VIA ELECTRONIC MAIL

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

Re: CASE 22-M-0429 – Proceeding to Implement the Requirements of the Utility Thermal Energy Network And Jobs Act.

STAGE 1 FILING - FINAL UTEN PILOT PROJECT PROPOSALS

Dear Secretary Phillips:

Pursuant to Ordering Clause 2 of the New York State Public Service Commission's *Guidance Order,*[1] Consolidated Edison Company of New York, Inc. hereby submits for filing in the subject proceeding a Final UTEN Pilot Project Proposal for each of the three pilot projects within its portfolio:

- **Chelsea Project** – This urban UTEN will recycle waste heat from a local data center to provide heating, cooling, and domestic hot water to nearby New York City Housing Authority low-income multifamily buildings, and is in a Disadvantaged Community;

- **Mount Vernon Project** – This scalable suburban UTEN will serve a dynamic mix of buildings (connected to the ambient loop system via heat exchangers) in an area identified as having leak-prone natural gas piping, and is in a Disadvantaged Community; and

- **Rockefeller Center Project** – This densely urban UTEN consists of three large commercial buildings converting from steam heating to UTEN-connected heat pumps and will offer year-round heating and cooling.

Should any questions concerning any of these filing arise, please contact me directly.

Very truly,

Nikolai Albert T. M. Wolfe, Esq.

[1] Case 22-M-0429, *Proceeding on Motion of the Commission to Implement the Requirements of the Utility Thermal Energy Network and Jobs Act*, Order Providing Guidance on Development of Utility Thermal Energy Network Pilot Projects (issued September 14, 2023) (Guidance Order).

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding to Implement the	)	
Utility Thermal Energy Network	)	Case 22-M-0429
and Jobs Act	)	

Utility Thermal Energy Network Final Proposal for the

Consolidated Edison Company of New York, Inc. Project at Rockefeller Center, Manhattan

I. INTRODUCTION

In September 2022, the Public Service Commission ("Commission") directed[1] each of the State's seven largest utilities to propose at least one utility-owned Thermal Energy Network ("UTEN") pilot project as a means of implementing the State's July 2022 Thermal Energy Network Jobs Act ("Thermal Networks Act").[2] In September 2023, the Commission issued guidance on the development of UTEN pilot projects, establishing a process whereby projects advance through development stages as pilot projects achieve milestones and/or receive approval from Department of Public Service Staff ("DPS Staff") or the Commission.[3] Pursuant to Stage 1 of this process, Consolidated Edison Company of New York, Inc. ("Con Edison" or the "Company") respectfully requests DPS Staff approval of this Final Pilot Project Proposal for its UTEN project located in Rockefeller Center ("Rockefeller Center Project" or the "Pilot") ("Final Rockefeller Center Proposal"). This Final Rockefeller Center Proposal builds on the Company's

[1] Case 22-M-0429, *Proceeding to Implement the Utility Thermal Energy Network and Jobs Act* ("UTEN Proceeding"), Order on Developing Thermal Energy Networks Pursuant to the Utility Thermal Energy Network and Jobs Act (issued September 15, 2022) ("Thermal Energy Network Order").
[2] Laws of 2022, Chapter 375 (enacted July 5, 2022).
[3] UTEN Proceeding, Order Providing Guidance on Development of Utility Thermal Energy Network Pilot Projects (issued September 14, 2023) ("UTEN Guidance Order").

October 2022,[4] January 2023,[5] May 2023,[6] and August 2023[7] proposals and updates, and provides new details per the UTEN Guidance Order requirements.[8]

The proposed Pilot will serve up to three large commercial buildings, covering a total of 3.6 million square feet of high rise building floorspace utilizing a variety of waste heat sources. In addition, the Pilot will engage customers and thermal resource providers with a unique rate structure.[9] The Pilot will also prioritize community engagement, the use of union labor, local job creation, and workforce development. The Rockefeller Center Project is designed to yield benefits and facilitate learning in five key areas:

1. **Emissions reduction:** The Pilot supports the achievement of Climate Leadership and Community Protection Act ("CLCPA") goals by reducing an estimated 273,000 metric tons of lifetime greenhouse gas emissions equivalent ("Lifetime CO_2e"). [10] It will also remove and recycle an estimated 75,900 MMBtu of heat currently released into the New York City ("NYC") environment each year. The Company estimates the future neighborhood-scale UTENs built from the Rockefeller Center Pilot model could each reduce 2,330,000 metric tons of Lifetime CO_2e, equal to 31,000 cars off the road.
2. **Evaluating the system, societal, and customer value propositions of commercial UTEN systems:** The Pilot will measure the reduction of the electric system impacts, which are

[4] UTEN Proceeding, Summary of Consolidated Edison Company of New York, Inc.'s Proposed Utility Thermal Energy Network Pilot Projects (filed October 7, 2022) ("October 2022 UTEN Proposal").
[5] UTEN Proceeding, Consolidated Edison Company of New York, Inc.'s Updated Proposal for Utility Thermal Energy Networks Pilot Projects (filed January 9, 2023) ("January 2023 UTEN Proposal").
[6] UTEN Proceeding, Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals (filed May 10, 2023) ("May 2023 UTEN Proposal").
[7] UTEN Proceeding, Updated Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Portfolio (filed August 16, 2023) ("August 2023 UTEN Proposal").
[8] UTEN Proceeding, UTEN Guidance Order, p. 20.
[9] See Section IX for details on rate design.
[10] Compared to remaining on current heating and cooling equipment using current energy sources.

estimated to be 50 percent less when compared to electrifying these buildings with Air Source Heat Pumps ("ASHPs"). The Pilot will also help quantify the overall societal value and customer bill impact of electrifying buildings with a high efficiency UTEN versus decarbonizing with ASHPs or Ground Source Heat Pumps ("GSHPs") without UTEN infrastructure.

3. **Equity and access to clean energy solutions:** The Company will explore opportunities to engage with and educate the local community and visitors to Rockefeller Center to increase awareness of and interest in UTEN technology as a cutting-edge clean energy solution.
4. **A just transition for the gas and local workforce:** The Pilot will employ union labor for skilled trades work in construction and operation of Company-owned thermal energy network infrastructure and equipment. The Pilot will also engage local businesses and employ local workforce in low-income communities, where possible, to prove out meaningful and scalable engagement models for union labor, local business, and local workforce development.
5. **Technical feasibility:** The Pilot aims to evaluate the technical viability of a UTEN using waste heat in high-rise mixed-use buildings in the heart of Manhattan. The Pilot will test the sharing of multiple waste heat technologies (cooling towers, ice storage, and steam condensate) and the scalability of the UTEN for other high-rise buildings. The experience gained through the Pilot will be necessary to scale the use of recycled waste heat, which has an estimated capacity to serve 70,000 to 100,000 dwelling units in Con Edison's territory.[11] Additionally, testing

[11] Estimate from analysis of data centers and sewer wastewater in Con Edison territory and research on other types of waste heat sources in Europe (https://www.reuseheat.eu/).

waste heat extraction from steam condensate could enable other large steam customers to save over 1 million gallons of water and 98 percent of quenching water costs annually.[12]

Con Edison is pursuing a diverse portfolio of UTEN pilots, in both dense urban and lightly urban/suburban environments, to support the Commission's evaluation of UTENs as a future utility offering and advance New York State's ("NYS" or "State") climate goals. The Rockefeller Center Project is one of the three UTEN pilots that Con Edison is proposing. Utilities implementing such projects are likely to encounter both successes and obstacles that will contribute unique learnings to the policy discussion on UTEN implementation. Allowing too few projects to move forward risks leaving the Commission and NYS with too small a data set from which to determine future policy. Approval of the Rockefeller Center Project is a critical step towards validating UTENs and thereby enabling UTENs to scale as a core clean energy solution that provides a just transition for the gas and local workforce.

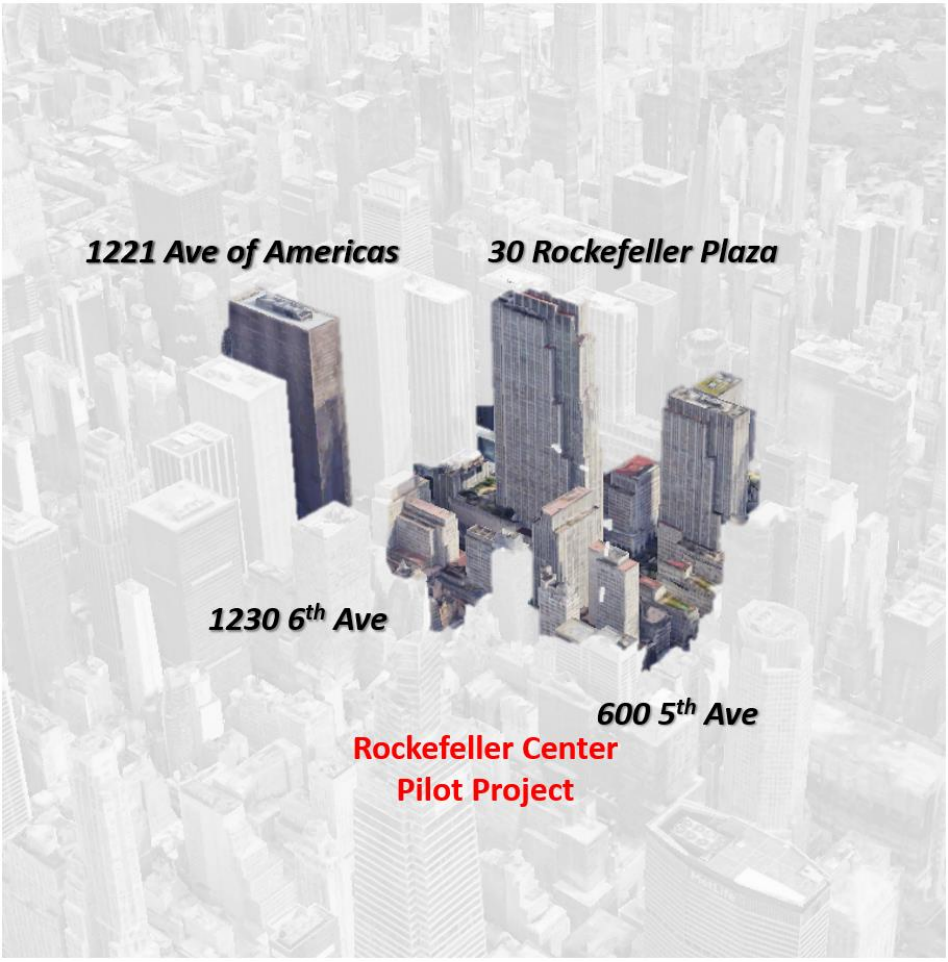
II. PROJECT OVERVIEW

The Rockefeller Center Project was jointly proposed by Tishman Speyer, AKF Engineering, and Ecosystem. The Pilot will convert three large commercial buildings in Midtown Manhattan from steam heating to UTEN-connected heat pumps. The UTEN will utilize clean recycled waste heat from a variety of sources (*i.e.*, multiple building systems, steam condensate) in the Rockefeller Center network of buildings, which spans three full city blocks. This will provide year-round heating in two of the three buildings and meet year-round heating needs for

[12] This is based on an evaluation of a proxy steam customer location. Customers typically dispose of their steam condensate by quenching it with city water to reduce its temperature below the required Department of Environmental Protection ("DEP") threshold of 150°F to dispose of it.

multiple loads in the remaining building. Integrating the buildings' cooling systems with the UTEN will also provide the option to use the UTEN to provide cooling.

Figure 1. Rockefeller Center Participating Buildings



The major participants for the Rockefeller Center Project are the building owners and tenants that will participate in the implementation of the Pilot. The buildings connected to the UTEN are owned by two major stakeholders: Tishman Speyer and Rockefeller Group. Tishman Speyer owns the Rockefeller Center Central Plant (located at 30 Rockefeller Plaza), 1230 6th Avenue, and 600 5th Avenue. Rockefeller Group owns 1221 Avenue of the Americas. The Rockefeller Center Project's UTEN customers of record will be Tishman Speyer and Rockefeller

Group. Since they own commercial buildings, both Tishman Speyer and Rockefeller Group will share in the cost of the Pilot with their own capital contributions in order to benefit from the reductions to their energy bills the Pilot will enable.

The portion of Rockefeller Center that will connect to the Pilot hosts millions of visitors per year, including numerous seasonal community events that are free and open to the public. The commercial tenants of these buildings include financial services, non-profit organizations, childcare, legal, retail, and food and beverage companies.

III. PROJECT OBJECTIVES

The Rockefeller Center Project will pilot novel technical and business approaches to deliver immediate and long-term benefits and learnings to customers, tenants, and the State. The Company expects that the findings from the Rockefeller Center Project will create a foundation for scaling UTENs as a future solution for high rise buildings in dense urban environments, as the Pilot will establish the best practices, processes, and metrics for success. The Company anticipates achieving the following goals and objectives:

Goal: Reduce emissions and achieve environmental goals, including those in the CLCPA, while proving out UTEN potential at scale to have lower societal costs than other electrification solutions.

- **Objectives:**
    - Reduce lifetime emissions by an estimated 273,000 metric tons of CO_2e, with the potential to reduce 2,330,000 metric tons of Lifetime CO_2e in future commercial UTENs built from the Rockefeller Center Pilot model;[13] and

[13] Compared to remaining on existing heating and cooling equipment using current energy sources.

- Reduce impact to the electric system by an estimated 50 percent when compared to converting the buildings to ASHPs.

Goal: Provide a just transition for the local workforce.

- **Objectives:**
  - Complete all skilled trade work for both customer and Company owned infrastructure with a union workforce;
  - Enter a Labor Peace agreement with UWUA Local 1-2 for the Company's internal workforce; and
  - Inform future workforce and labor engagement strategies for UTEN.

Goal: Develop technical capabilities to deliver the Pilot and scale UTEN systems in the future.

- **Objectives:**
  - Test how to adapt a UTEN to large high-rise buildings common throughout NYC and other high density urban environments where geothermal boreholes are costly or technically infeasible;
  - Validate the design, operation, and balancing of a UTEN system using a wide range of recycled waste heat sources, including:
    - An ice plant;
    - Heat recovery from Rockefeller Center Central Plant;
    - Data centers;
    - District Steam condensate waste heat recovery
  - Generate learnings necessary for future UTEN systems that dynamically balance multiple clean thermal resources in an animated market with building heating and cooling needs.

Goal: Develop rates that work for customers and thermal resource providers, and encourage efficient use of UTEN systems.

- **Objective:**
    - Test rates that keep the UTEN system (utilizing multiple waste heat sources) in balance and are clearly understandable to commercial building owners and thermal resource providers.

Goal: Benefit and engage the customers and community through the Pilot lifetime and beyond.

- **Objective:**
    - Educate millions of annual visitors to Rockefeller Center through free community events, with educational materials on clean energy benefits and Tishman Speyer's corporate commitment to be operationally net zero carbon by 2050.

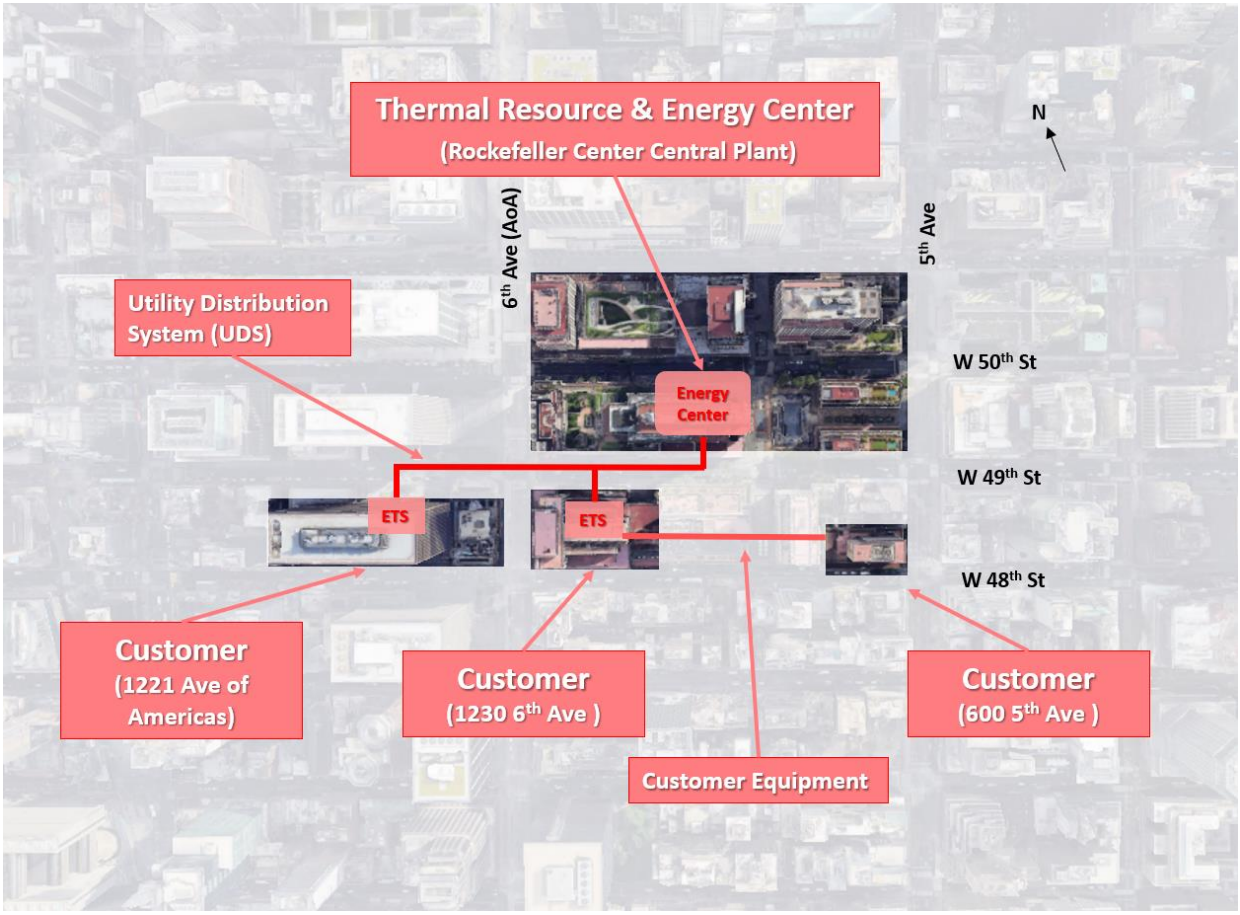
IV. SYSTEM DESIGN[14]

The Rockefeller Center Project design will test the technical feasibility of a UTEN with high-rise commercial buildings in a dense, urban environment using waste heat from a variety of sources. It will capture thermal energy that would be otherwise wasted from multiple Rockefeller Center buildings via the Rockefeller Center Central Plant (the Thermal Resource) at 30 Rockefeller Plaza. It will then transfer and transport the energy via the Utility Distribution System ("UDS") to the Customer Equipment that will provide heating, with the option to cool. The Energy Center will have equipment necessary to operate the UDS. The Supervisory Control and Data Acquisition ("SCADA") System will control, monitor, and analyze the performance of the overall UTEN.

[14] All terms have been updated to reflect the updated terms from the UTEN Terms and Definitions Technical Conference. *See*, Matter 23-02117.

The Thermal Resource, UDS, Energy Center, Customer Equipment, and SCADA System will be designed to allow for more buildings to connect in the future. Figure 2 below presents the buildings and elements of the Rockefeller Center Project in relation to one another. Each part of the UTEN is described in more detail below.

Figure 2. Elements of the Rockefeller Center Project UTEN



Thermal Resource

The Thermal Resource will be excess heat from server loads, recovered steam condensate heat, chiller plants, and cooling towers at the Rockefeller Center Central Plant. The Central Plant will contribute heat to the UTEN to assist in maintaining the ambient temperature of the UDS.

Utility Distribution System

The UDS will consist of one or more Thermal Resource Energy Transfer Stations ("Thermal Resource ETSs"), supply and return pipes, and multiple ETSs connecting the UDS to the Customers located at 1221 Avenue of the Americas, 1230 6th Avenue, and 600 5th Avenue ("Customer ETSs").

The number and location(s) of the Thermal Resource ETSs will be selected during the Pilot Project Engineering Design ("Stage 2") portion of the Pilot. The Thermal Resource ETS heat exchangers will transfer captured heat into the UDS piping described below. These Thermal Resource ETSs will also include valving, metering and controls equipment, and potential supplemental pumping. They will be located inside Rockefeller Center Central Plant.

The UDS supply and return pipes will transport the thermal energy between the Thermal Resource ETSs and the Customer ETSs. These pipes will be buried underground below the frost line where possible and will be filled with a Heat Transfer Medium, a water-based solution that may contain freeze protection adequate for a fluid temperature range of approximately 30-90°F. Based on the preliminary design, the UDS is sized for 16-inch steel pipe, which will be protected from internal and external corrosion. The UDS pipe size and material will be selected during Stage 2 of the Pilot when the load requirements of the Pilot's customers are fully quantified. Once fully designed, the network's base and peak loads will be established. Currently, the Rockefeller Center Pilot assumes the system will be designed to satisfy the total connected load (base and peak loads) through normal operation of the UTEN without the use of additional fossil fuel-fired supplemental heating or cooling.

One Customer ETS will be located at 1221 Avenue of the Americas. There could be one Customer ETS for both 1230 6th Avenue and 600 5th Avenue since both buildings are owned by

Tishman Speyer. Alternatively, there could be one ETS at each building. The precise Customer ETS configuration will be determined during Stage 2 of the Pilot. The Customer ETS heat exchanger will transfer the thermal energy between the UDS and the Customer Equipment. A British Thermal Unit ("BTU") meter will use flow rate, inlet temperature, and outlet temperature readings from the Company side of the heat exchanger to calculate the amount of thermal energy transferred between the UDS and the customer. The BTU meter readings will be used to bill the customer for use of the UTEN. Stage 2 of the Rockefeller Center Project will determine meter selection and billing integration strategy.

Energy Center

The Energy Center will be the Company equipment necessary to operate the UDS. Energy Center equipment and instrumentation will be located at 30 Rockefeller Plaza, within the Rockefeller Center Central Plant. The Energy Center will include hydronic pumps to circulate the Heat Transfer Medium throughout the UDS, UDS makeup fluid tanks and controls, UDS heating/cooling controls, and other UDS equipment and instrumentation such as water chemistry monitors and controls.

Customer Equipment

The Rockefeller Center Project's Customer Equipment will use the UTEN to provide heating in three buildings and give the buildings the option to use the UTEN for cooling as well. 600 5th Avenue will convert entirely to UTEN for space heating. 1230 6th Avenue will switch its hydronic heating distribution system to UTEN heating, while retaining district steam for its other distribution system. 1221 Avenue of the Americas will also switch its current hydronic distribution system to UTEN, and it will connect additional heating distribution systems to the UTEN over

time as it converts them to hydronic distribution. Each of the building heating distribution systems that connect to the UTEN will disconnect from district steam.

The Customer Equipment will begin at the isolation valve on the customer side of the Customer ETS heat exchangers located at the customer buildings. (See "Point of Demarcation" below.) The Customer Equipment at a minimum will include supply and return piping, valves, heat pumps, and Heating, Ventilation, and Air Conditioning ("HVAC") mechanical components and controls needed to operate the customer side of the UTEN.

Supervisory Control and Data Acquisition System

The Rockefeller Center Project will implement a SCADA system to control, monitor, and analyze the performance of the UTEN. The SCADA system will provide active safety, resiliency, reliability and reporting benefits to the Pilot. It will generate alarms to alert the Company if it detects abnormal operating conditions. It will also generate and store operational data to facilitate reporting and analysis during the Pilot's five-year operation period. This will include data collected from the BTU meters installed at the Thermal Resource ETS and the Customer ETS heat exchangers to document how much thermal energy is transferred to and from the UDS. The SCADA system, metering, and data communication designs will be developed during Stage 2 of the Pilot.

Table 1 provides a breakdown of the Project scope of work between the Company and the Pilot Participants. Table 2 provides a further breakdown of the scope of work in each building.

Table 1. Rockefeller Center Project Construction Scope of Work by Party

Party	Scope of Work
Con Edison	• Install 1,000 linear feet of distribution piping ("UDS supply and return piping"). • Install and integrate ETSs at each customer building and the Energy Center. The ETSs include heat exchangers, valving, metering and controls equipment, and potential supplemental pumping. • Install hydronic pumping equipment and associated infrastructure. • Install a shell and tube heat exchanger connected to a dedicated district steam service to provide emergency backup to the UTEN system.

Pilot Participants	• Install piping and equipment at the Rockefeller Center Central Plant for injection of waste heat (*i.e.*, exhaust heat recovery coils, pumping stations, ice plant condenser water valving, chiller plant).
	• Install WSHPs as part of the Customer Equipment located at:
	  ○ 1221 Avenue of Americas;
	  ○ 1230 6th Avenue; and
	  ○ 600 5th Avenue.

Table 2. Rockefeller Center Project Scope of Work by Building Site

Buildings	Scope of Work
30 Rockefeller Plaza / Rockefeller Center Central Plant	• Connect Central Plant cooling system to the UDS via the Thermal Resource ETS
1230 6th Avenue	• Connect the UTEN system to the building's hydronic distribution system via Customer ETS. • Install large heat pump(s) for building heating. • Install necessary hydronic pumping equipment. • Potentially integrate building cooling systems into Customer ETS to allow for UTEN cooling
600 5th Avenue	• Connect the UTEN system to the building's hydronic distribution system via a heat exchanger. • Install large heat pump(s) for building heating. • Install necessary hydronic pumping equipment. • Potentially integrate building cooling systems into Customer ETS to allow for UTEN cooling
1221 Avenue of the Americas	• Connect the UTEN system to the building's hydronic distribution system via a heat exchanger.

	• Install large heat pump(s) for building heating. • Install necessary hydronic pumping equipment. • Potentially integrate building cooling systems into Customer ETS to allow for UTEN cooling

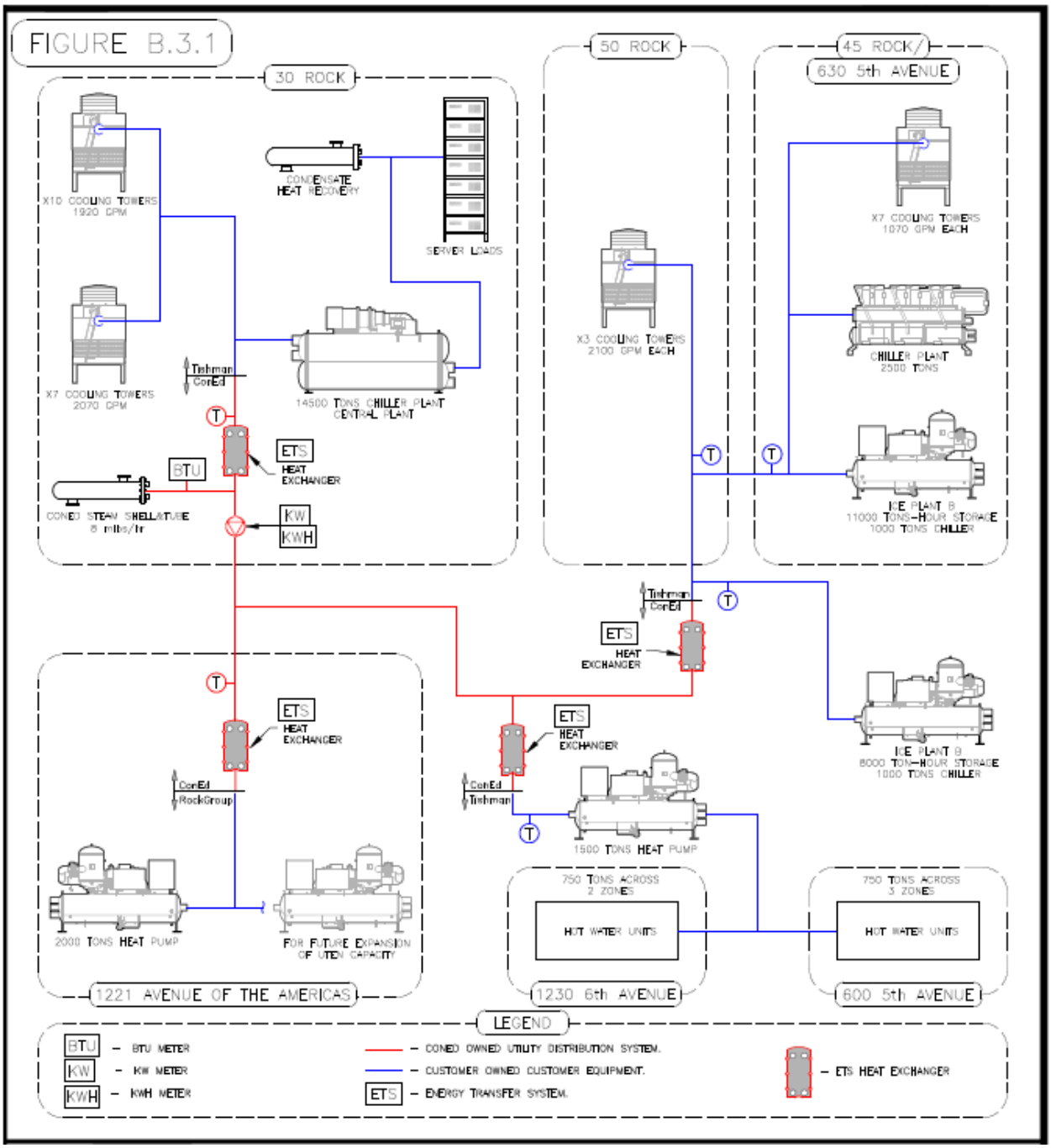
Point of Demarcation

The Pilot's demarcation points mark where Company-owned and operated equipment ends and customer- or third party-owned and operated equipment begins. The demarcation point for the Thermal Resources owned by Tishman Speyer will be the isolation valves at the thermal resource side of a Thermal Resource ETS heat exchanger. There may be multiple Thermal Resource ETS heat exchangers to capture all of the waste heat from various locations throughout the Rockefeller Center Central Plant. The Company will own the UTEN equipment and infrastructure up to the isolation valve on the thermal resource side of a Thermal Resource heat exchanger. Tishman Speyer will own all equipment and infrastructure on their side of the isolation valve.

The demarcation point for the Customer will be the isolation valve on the customer side of the Customer ETS heat exchanger associated with each customer. The Company will own the UTEN equipment and infrastructure up to the isolation valve on the customer side of the Customer ETS heat exchanger. The Customer will own all equipment and infrastructure past this isolation valve.

The demarcation points and an overview of the UTEN infrastructure for the Rockefeller Center Project are depicted in the one-line diagram in Figure 3. A full-sized building one-line diagram and additional one-line diagrams can be found in Appendix A.

Figure 3. Rockefeller Center Project Building One-Line Diagram



On-Site Energy Efficiency Upgrades

During the pre-design process, the Company and Rockefeller Project Participants have not yet identified any energy efficiency opportunities that would cost-effectively reduce UTEN system

and operating costs. However, the Company and Participants will continue to assess opportunities throughout Project Design.

Thermal Energy Resources

Per the UTEN Guidance Order, the Rockefeller Center Project will not provide new natural gas service to the customer or include the installation of new fossil fuel equipment. In addition, the Pilot will not include the use of fossil fuel resources at either the customer level or the UDS level. However, to ensure customer reliability and system resiliency for heating, the Rockefeller Center Project will for emergency and backup purposes utilize district steam via a Company-owned shell and tube heat exchanger connected to the UTEN in the Energy Center (physically located in the Rockefeller Center Central Plant). During normal operation, the shell and tube heat exchanger will be offline. Although steam is not a fossil fuel, it is currently produced by fossil fuel-fired boilers at Con Edison steam generating stations. However, Con Edison's long-term plan is to decarbonize its steam generating stations. When that occurs, the production of the district steam for the Rockefeller Center Project's emergency and backup situations will be carbon-free.

Safety, Reliability, and Resiliency

It is critical that the newly developed UTEN system is constructed and operates safely, reliably, and resiliently. To ensure reliability, the Company will design the Rockefeller Center Project to be monitored and controlled by a SCADA system and to include supplemental thermal energy resources to maintain a balanced system. Throughout the operational phases of the Pilot, the Company will evaluate and determine the level of supplemental systems required for the existing Pilot and future UTEN systems. The Company will address the following key considerations as part of the Pilot's implementation to provide its customers with safe, adequate, and reliable service:

Safety

- Establish standards for handling and containing Heat Transfer Medium solutions;
- Leverage existing Company standards and procedures related to construction, infrastructure maintenance, and leak management, and modify as necessary to apply to the UTEN and its associated equipment;
- Comply with existing standards and procedures for any associated or impacted electric and gas infrastructure and equipment;
- Comply with existing standards and procedures for the new steam infrastructure and equipment required to ensure UTEN reliability during emergency and backup situations;
- Design equipment and infrastructure with appropriate heights, clearances, and shut-offs for safe maintenance;
- Incorporate sensors and equipment statuses into SCADA to allow the Company to remotely monitor the operation of the network to allow for early detection of potential faults or safety risks; and
- Establish operating and emergency procedures for the Pilot.

Reliability

- Incorporate sensors and equipment statuses into SCADA to allow the Company to remotely monitor and maintain system performance;
- Develop appropriate redundancy standards such that service can be preserved should a piece of equipment fail;
- Incorporate a shell and tube heat exchanger at the Energy Center such that district steam can be used to provide heat to the UTEN during emergency and/or backup situations;

- Develop appropriate capacity standards such that a reserve of capacity is available to meet fluctuating energy needs and waste heat availability; and
- Design for future system expansion by having a greater capacity than the connected load. The extra capacity will have reliability benefits during the five-year operation period of the Pilot.

Resiliency

- Design the system with redundancies and creating a logistics supply chain so that repairs can be made quickly;
- Design the system to meet applicable flood standards;
- Design the system to operate reliably through temperature and weather extremes; and
- Design the system to operate reliably within the operational environment of a public right-of-way.

Future Scalability

The Company has designed the Rockefeller Center Project to be able to scale if successful. The Pilot is surrounded by large high-rise buildings with varying energy usage profiles on all sides for effective load balancing. Once the Pilot has been constructed, additional buildings can be connected to the UTEN to provide and consume clean recycled waste heat. Several buildings in the area have already expressed interest in potentially connecting to the UTEN once it is in operation. Multiple sources of sewer heat recovery are in the area as well.

V. PROJECT PLAN

Workplan

The following summarizes the Company's proposed workplan for the Rockefeller Center Project, including key stages, deliverables, and milestones.

Stage 1: Pilot Scope, Feasibility, and Stakeholder Engagement

Currently, all UTEN projects are in Stage 1 of the process as outlined by the September Order.[15] In Stage 1, the Company is developing a Final Pilot Proposal.

Activities

- Complete conceptual project design and cost estimates
- Complete initial building walkthroughs
- Conduct street surveys
- Conduct initial stakeholder engagement
- Develop initial design contracts
- Develop framework for workforce integration
- Develop components and templates for customer agreements

Deliverables

- Submit Final Pilot Proposal

Milestones

- Company files Final Pilot Proposal by **December 15, 2023**
- DPS Staff reviews Final Pilot Proposal and issues a Compliance Letter for the Company to advance to Stage 2

[15] UTEN Proceeding, UTEN Guidance Order, p. 19.

Stage 2: Pilot Engineering Design and Customer Protection Plan

In Stage 2, the Company will secure the primary design firm and commence full Engineering Design of the Pilot.[16] In addition, the Company will develop the Final Customer Protection Plan. Both the Engineering Design and the Customer Protection Plan will be submitted to the Commission for review at the end of this stage.

Activities

- Procure contracts for final Engineering Design
- Determine location for Thermal Resource ETSs
- Determine Customer ETS configuration
- Select UDS pipe size and material
- Assess energy efficiency upgrade opportunities that could be cost effective over the course of the five-year pilot period
- Finalize Pilot cost estimates based on final UTEN design
- Determine meter selection and building integration strategy
- Develop a SCADA system, metering, and data communication designs
- Perform customer and community outreach and engagement
- Obtain preliminary customer commitments for participation in the Pilot
- Develop the Final Customer Protection Plan, including the customer service agreement
- Finalize rate design
- Finalize workforce integration plans

[16] The Company will not enter Stage 2 before January 2024 to account for the procurement process of the design engineering firm.

Deliverables

- Submit Pilot Engineering Design
- Submit Final Customer Protection Plan

Milestones

- Company files Pilot Engineering Design and Final Customer Protection Plan within nine months of DPS Staff issuing the Company's Compliance Letter and is issued for public comment
- Commission issues an Order determining whether the Pilot can advance to Stage 3

Stage 3: Customer Enrollment and Pilot Construction

In Stage 3, the Company will secure the minimum customer enrollment to commence construction. Once approved for construction, the Company will competitively procure all necessary construction contracts to build the UTEN system. Construction activities will include both utility-owned infrastructure in the streets, thermal energy resources, and Energy Center and customer-owned equipment located inside private buildings.

Activities

- Finalize construction contracts
- Enroll customers in the Pilot
- Execute agreement for thermal energy source providers
- Procure all materials and equipment needed for construction
- Install all equipment associated with the Energy Center (located at the Rockefeller Center Central Plant)
- Complete all street infrastructure work involving the installation of piping systems
- Complete all customer-owned building equipment installations
- Complete any previously identified energy efficiency upgrades, if applicable

- Complete installation of SCADA communication system

Deliverables

- Submit letter documenting customer enrollment

Milestones

- Once the Company files a letter documenting customer enrollment, Pilot's construction may begin
- Completes construction within 12 to18 months after commencement of Pilot construction

Stage 4: Pilot Operation and Management

In Stage 4, the Company will commission the thermal energy network and confirm proper operation of all network equipment. Once confirmed, individual buildings will have their building systems converted to UTEN and be tied into the network. Operational data and standardized metrics will be recorded and analyzed throughout the Pilot's life cycle.

Activities

- Commission Utility Distribution System
- Commission Thermal Energy Resources
- Commission Energy Center equipment
- Commission Customer Equipment
- Connect customers to UTEN
- Recruit and connect remaining customers
- Provide maintenance of both customer-owned and Company-owned equipment
- Collect data and trends from the UTEN and optimize the system throughout the Pilot
- Retain regular communications with enlisted customers for customer feedback
- Establish and commence UTEN customer billing

Deliverables

- Complete UTEN system commissioning letter
- Complete thermal resource (Rockefeller Center Central Plant) commissioning letter
- Obtain customer agreements from enrolled customers
- Report standardized metrics at intervals determined by DPS Staff

Milestones

- Connects first customer post-UTEN system commissioning
- Completes five-year Pilot operation period

Stage 5: Pilot Review, Recommendations, and Conclusion

In Stage 5, the Company will review and analyze all the data that has been collected throughout the duration of the Pilot. The Company will perform an overall project review, produce recommendations, and propose next steps for the future of the Rockefeller Center Project.

Activities

- Analyze the Pilot data and perform Evaluation, Measurement, and Verification ("EM&V")
- Document key findings
- Perform an evaluation of the Pilot
- Propose recommendations to the Commission
    - Future UTEN pilots
    - Full-scale UTEN operations
    - Promulgations of regulations necessary to support UTEN operations
- Create Pilot Close-Out Report

Deliverables

- Compile Pilot Review and Recommendations Report
- Compile Pilot Close-Out Report

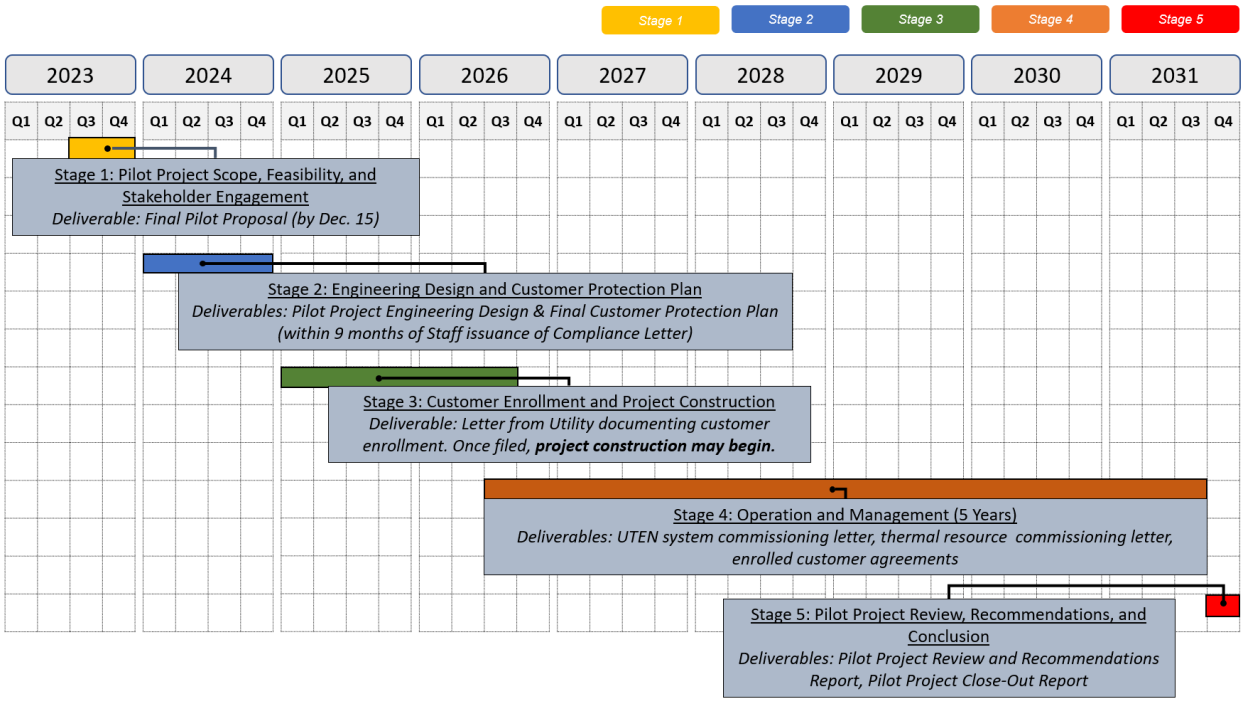
Milestones

- Submit Review and Recommendations Report
- Submit Pilot Close-Out Report

Pilot Timeline

The figure below details the proposed Pilot timeline broken out by stage.

Figure 4. Pilot Timeline



Project Management Team

The Company will have a dedicated Utility Thermal Energy Networks internal team ("UTEN Project Team") overseeing the development, design, construction, and operation of the Pilot. This dedicated team's members will specialize in specific areas, such as pilot design, strategy, engineering, project management, and customer protections and engagement. To better assist in areas that are novel to the Company, outside consultants will be added to supplement this core team. Those areas of expertise range from thermal rate design to thermal energy network system design.

In addition to this team, other departments within the Company will provide support in various areas of expertise, including, but not limited to: Legal, Customer Operations, Finance, Environmental Health and Safety, Rate Engineering, Billing, Procurement, and Gas Operations.

The Pilot will have a lead design engineering firm that will be responsible for the overall design of the Pilot. The Company will contract that design firm, which will report directly to the UTEN Project Team. The UTEN Project Team will also directly oversee the construction of the Pilot, as well as its commissioning and operation.

The larger project team will also include key stakeholders, such as skilled labor workforce representatives, local government officials, UTEN customers, thermal resources contributors, and community leaders.

Labor and Workforce Development

A major objective of the Thermal Networks Act is the engagement of union workforce, including workers in trades impacted by future changes to the gas system. Successful rollout and implementation of UTENs requires a trained and qualified workforce that can install, operate, and maintain the required infrastructure. The Company has identified two major workstreams for the

transition of skilled labor towards UTEN systems: third-party contractor workforce and internal Company workforce. Both workstreams are important to not only the success of the Pilot, but also to the scaling of thermal energy networks in the future.

The Rockefeller Center Project will leverage New York City and New York State agencies to share information and workforce opportunities associated with the construction of the Pilot.

Third-Party Contractors

The Company will procure third-party contractors for work on both customer-sided equipment and Company-owned UTEN infrastructure. Examples of customer-sided work are plumbing and HVAC installations in customer buildings to connect to the UTEN. Company-owned UTEN infrastructure work includes installation of UTEN distribution piping, excavation, and street restoration. The Company will require that all skilled trade work on the thermal energy network infrastructure and equipment which it procures for the Pilot be completed by a union workforce. In addition, the Company will collaborate with local community organizations and trade groups to educate and share information regarding the potential UTEN work opportunities and seek vendors that will incorporate and develop local workforces. Throughout the Pilot, the Company will follow all best labor practices as outlined in the Thermal Networks Act.

Company Workforce

The Company will have a Labor Peace agreement with UWUA Local 1-2 for the internal workforce. Additionally, the Company will partner with the local community, leveraging the extensive tenant diversity within the buildings in the Pilot to share information about the Pilot, including all potential workforce opportunities. The Company will also design a short-term and long-term workforce plan to train employees with the skills, knowledge, and abilities to meet the

strategic objectives of the Thermal Networks Act. This effort will proceed in three steps: 1) Workforce Development Plan; 2) Training and Implementation; and 3) Workforce Integration.

Step 1: Workforce Development Plan

- Establishing the Workforce Development Committee
    - The Company will first establish a UTEN Workforce Development Committee ("WDC") that will focus on Company labor. The mission of the WDC will be to develop a Company workforce plan that will deliver the right mix of employees to install, operate, and maintain the new UTEN infrastructure. The WDC will consist of key stakeholders from Company organizations such as Gas Operations, Gas Engineering, Human Resources, Union Labor Representatives, and The Learning Center. The WDC will provide oversight over all components necessary to integrate and transition existing company employees to perform UTEN work functions, including but not limited to: determining the right skill sets required; the number of individuals needed for each job category; content and schedule of training programs; and deciding what other areas of the organization will be part of the mix of staffing for the Pilot.
- Workforce Needs and Available Talent
    - The WDC will focus first on understanding all aspects of the nature and scope of the work related to the provision of thermal energy for heating and cooling. This clarification of work objectives is intended to aid in the development of an improved outline of the duties and tasks associated with the Pilot and is expected to provide insights into the amount and type of roles needed to meet Pilot deliverables.

- The next step is to determine available talent within the Company. Based on the similarities of the infrastructure piping used for thermal energy networks and the Company's natural gas system, existing gas personnel within the Company will play a central role in staffing the UTEN project. The unique experience of current Gas Operations employees gained through working on the gas system over time positions the Company to upgrade the skills of this group more rapidly, therefore quickening the learning curve required to meet any special skills associated with the UTEN systems. In addition to the gas workforce, additional employees from other departments will be evaluated for their suitability to support the needs of the Pilot, including employees in Customer Operations, Environmental Health and Safety, Construction, the Call Center, The Learning Center, and the Control Centers.

- Skills Assessment and Identifying Gaps
  - A skills assessment will be a necessary part of the Company workforce planning process to properly match current positions against the specific knowledge and skill requirements of UTENs. The WDC will select those positions with the right knowledge and talents for the Pilot after conducting this skills assessment.
  - To staff the Pilot with enough people and with the right skills and experience to successfully complete the Pilot goals and objectives, the WDC must also address skill gaps. After undertaking a skills inventory, the WDC will best understand what skill gaps exist within the Company and will create a training and development plan to close those gaps. The role of the WDC will entail creating an outline of training activities to raise the levels of skills required for Pilot execution.

Step 2: Training and Implementation

- The WDC, working closely with the Company's Learning Center, will create new curriculum and/or leverage existing training and development programs to reskill and/or upskill existing gas employees and other Company personnel as needed. Training programs will consist of entry-level and career path Company-led programs and will include a variety of methods, including but not limited to: classroom training of field employees to effectively operate and maintain thermal energy systems; on-the-job hands-on experience; digital learning; job aids; and mentorship to support the transition to the new UTEN system. Providing retraining opportunities and support for employees is consistent with the Company's culture of building on existing technical skills and serves to motivate the workforce.
- Throughout the transition, it is important that field operating departments and personnel establish basic work principles and procedures to be able to maintain and operate the Pilot. In addition, all other functions outside of operations will be trained and prepared to supplement the needs of the Pilot. These include but are not limited to the Billing Department, Call Center Representatives, Energy Services, and The Learning Center.

Step 3: Workforce Integration

- In addition to preparing internal organizations and personnel for the workforce transformation, the WDC will also partner with union leaders and representatives to facilitate a smooth transition of work activities. This involves sharing the Company's clean energy priorities and how this move fits into the Company's overall business strategy. Partnering with the union at every stage of the process will increase support for building a workforce to successfully implement the Pilot.

Potential Barriers and Risks

Given the novelty of the proposed UTEN design, the Company expects that some challenges may arise. As such, the Company will work to identify, assess, and mitigate risks that may occur throughout the Pilot to the best of the Company's ability. An example of potential barriers and actions the Company may take to address these risks are summarized below.

Table 3. Potential Barriers and Mitigation Strategies

Potential Barrier	Mitigation Strategy
• **Supply Chain:** Delays in market availability of industrial sized heat pumps for high-rise buildings	• Conduct advanced market research of global marketplace to maximize potential suppliers and account for potentially long lead times
• **Installation:** Interference and construction delays associated with the installation of large diameter pipes under 49th Street in Manhattan	• Conduct advanced street surveys and exploratory test pits to identify all existing infrastructure, allowing for the most efficient installation
• **Community Engagement:** Lack of community awareness of the Pilot, especially given the absence of a stand-alone Energy Center	• Work directly with building owners to develop and deploy Pilot information and signage in commercial buildings that will be connected to the UTEN
• **Labor:** Availability of skilled workforce to construct and install thermal energy network infrastructure	• Identify skill sets needed for Pilot Construction during Pilot Design Phase • Partner with local workforce development organizations to close any skill gaps and develop a large pool of available and skilled contractors

VI. BUDGET

The cost estimates below are based upon the conceptual design of the Rockefeller Center Project. The Company collaborated with an engineering consulting firm experienced in installing thermal energy network systems to estimate project costs. Where uncertain, the Company utilized historical cost data and best practices from traditional utility projects. As shown in Table 4, the Company estimates $75.9 million, plus an additional $10.5 million in portfolio administration costs, to develop and complete the Rockefeller Center Project. Overarching portfolio administration costs include, but are not limited to incremental labor, support services, program management, and data management.

Table 4. Summary of Total Project Costs by Stage[17]

Stage	Rockefeller Center Project Costs	Share of Portfolio Administration Costs[18]	Total
Stage 1	$103,005	$262,500	$365,505
Stage 2	$7,488,995	$787,500	$8,276,495
Stage 3	$60,736,000	$8,400,000	$69,136,000
Stage 4	$7,008,000	$945,000	$7,953,000
Stage 5	$584,000	$105,000	$689,000
Total	**$75,920,000**	**$10,500,000**	**$86,420,000**

Table 5. Summary of Total Project Costs by Category

Con Edison Estimated Costs	Rockefeller Center Project
UTEN Construction *(UDS, Energy Center, ETSs, etc.)*	$17,500,000

[17] Contingency costs are included in total costs. Contingency costs were calculated as 30% of the Pilot costs.
[18] The Company identified portfolio administrative costs associated with the three proposed pilots in the August 2023 UTEN Proposal. Note that for the Final Rockefeller Center Proposal, the Company is allocating the Pilot-specific administrative costs by dividing the total administrative costs by the number of projects it is proposing (3).

Customer Equipment Construction *(Heat Pumps, Customer Pipes, etc.)*	$17,000,000
Engineering/Implementation/Operations	$20,100,000
Utility Capital Overheads and Sales Tax	$3,700,000
Estimated Project Costs	**$58,400,000**
Contingency *(30% of Estimated Project Costs)*	$17,520,000
Estimated Project Costs Including Contingency	**$75,920,000**
Portfolio Admin *(1/3 of Full Portfolio Estimate)*	$10,500,000
Total Estimated Costs	**$86,420,000**

Budget Flexibility

Given the novelty of the Rockefeller Center Project, the Company must be able to quickly adapt the Pilot to the inevitable challenges and opportunities that will arise during design and implementation. To achieve this, the Company seeks budget flexibility in how it allocates the costs of capital and non-capital work. For example, as the Company finalizes the design of the Rockefeller Center Project, it may find alternative piping configurations which may result in variations in the split of costs between capital and regulatory asset, based on ownership of that piping.

VII. LIFE CYCLE COST ANALYSES

Per the requirements of the Guidance Order,[19] the Company conducted lifecycle cost analyses ("LCAs") of the Rockefeller Center Project and three alternative heating and cooling system configurations.[20] For each of these, the Company considered the Societal and Customer perspectives, and assessed lifecycle costs for both Pilot and Full-Scale scenarios of the project. All costs were assessed using real (2023) dollars.

It is important to note upfront that these analyses have been performed prior to completing full engineering and design of the Rockefeller Center Project, which will be during Stage 2 of the Pilot. Further, projecting over an 80-year analysis period entails substantial uncertainties. The LCA Limitations section below details additional considerations. Accordingly, these analyses are only directional estimates of the relative lifecycle costs of the Pilot and alternative heating and cooling solutions.

The below sections describe the LCA approach and results, with greater details in Appendix C.

System Configurations Analyzed

The Company quantified lifecycle costs of 1) building electrification with a UTEN, 2) electrification of individual buildings using only ASHPs, 3) electrification of individual buildings drilling their own boreholes and using their own GSHPs; and 4) the buildings' existing heating and cooling methods with heating fuels that are decarbonizing over time.[21] Lifecycle costs include

[19] UTEN Proceeding, UTEN Guidance Order, p. 39.
[20] An LCA differs from a NYS Benefit-Cost Analyses ("BCA") in that it quantifies the absolute costs of each heating and cooling system type. By contrast, a BCA would define a baseline case (e.g., natural gas heating with no low carbon fuels) and compare the costs of the three building electrification options relative to this baseline reference point. For example, the LCAs quantify as a cost the greenhouse gas emissions of each of the four systems. A BCA would quantify as a benefit the emissions reductions of the electrification systems compared to staying on fossil fuel heating.
[21] See "System Configuration Energy Costs and the CLCPA" section below for further discussion.

the purchase of materials and equipment, construction and installation in the street and buildings, equipment operation and maintenance, and equipment replacement. The Company used an 80-year analysis period to match the expected lifetime of the UTEN system.

System Configuration Energy Costs and the CLCPA

For all of its analyses, the Company assumes that New York State's energy systems meet the State's CLCPA goal of achieving net-zero emissions by 2050.[22] The Company aligned projected energy supply and delivery costs with the Con Edison Gas System Long-Term Plan ("Gas LTP") assumptions.[23] The Gas LTP models several decarbonization pathways for the Con Edison service territory to reduce emissions to meet CLCPA goals, incorporating various levels of renewable generation, low carbon fuels, and building electrification. In the LCA electrification system configurations (*i.e.*, UTEN, ASHP, and GSHP), the model costs follow the Deep Electrification Pathway which has widespread building electrification and significantly reduces use of the gas system. For the system configuration retaining the buildings' existing heating and cooling methods, the model costs follow the Hybrid Pathway which maintains a significant portion of the gas network but decarbonizes the heating fuel via the switch to low carbon fuels over time. This system configuration will therefore be referred to as the Decarbonizing Business As Usual ("DBAU").[24]

[22] Laws of 2019, Chapter 106 (enacted June 18, 2019).
[23] Case 23-G-0147, *In the Matter of a Review of the Long-Term Gas System Plans of Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.* ("Con Edison and O&R GSLTP Proceeding"), Gas System Long-Term Plan (filed May 31, 2023) ("Gas LTP").
[24] In both pathways, there is 100% clean electricity generation by 2040, and the steam system decarbonizes using renewable electricity, low carbon fuels, and carbon capture.

Societal vs. Customer LCAs

The Societal and Customer LCAs considered different perspectives. The Societal LCA considered the relative costs that each system configuration imposes on society as a whole. These include all system equipment, construction, installation, and replacement costs; energy supply costs; the impacts of each solution on utility electric or gas networks; and the social cost of carbon dioxide equivalent emissions ("Social Cost of Carbon").[25] The Societal models exclude state taxes. The Societal models discount all costs using three percent societal discount rate.[26]

The Customer LCA considers the perspective of just the participating customers, restricting itself to the costs that these customers experience. These include the costs that customers pay to purchase and install heating and cooling equipment, their energy supply and utility delivery rates,[27] a carbon price,[28] and state taxes. The Customer analyses use a blended real customer discount rate based on the customer market segment.[29]

Analyses completed from the Societal perspective should be used as the primary indicator of the value that UTEN projects will provide to New York State. The Customer perspective is helpful to understand whether customers will have an economic incentive to adopt the UTEN solution. Where a UTEN is the lowest cost solution for society but not the lowest lifecycle cost for

[25] Greenhouse gas emissions costs are the annual costs NYS Department of Environmental Conservation three percent discount rate scenario. *See,* https://www.dec.ny.gov/docs/administration_pdf/vocapp23.pdf. Social Cost of Carbon is applied to carbon dioxide equivalent calculations that use 20-year global warming potential values and incorporate the emissions associated with production and transport of fossil fuels (lifecycle emissions). *See,* https://extapps.dec.ny.gov/docs/administration_pdf/ghgappxclcpaemissfctrs22.pdf.

[26] Consistent with the discount rate used in the NYS DEC cost of carbon calculation.

[27] For the Pilot, the utility will subsidize customer equipment and building upgrades as well as rates (See Section X).

[28] Carbon costs reflect an expected carbon cost and accounting for New York State's planned implementation of the Cap and Invest framework. This is assumed equal to the Social Cost of Carbon values from the DEC three percent discount rate scenario used for the Societal LCA. *See,* https://www.dec.ny.gov/docs/administration_pdf/vocapp23.pdf.

[29] Consistent with rates NYSERDA used in its 2023 *Assessment of Energy Efficiency and Electrification Potential in New York State Residential and Commercial Buildings*, *Appendix A. See,* https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Building-Stock-and-Potential-Studies/Assessment-of-Energy-Efficiency-and-Electrification-Potential, p. 37. The Company converted nominal rates in the NYSERDA report to real rates using a two percent assumed inflation rate.

participating customers, customer equipment subsidies would be appropriate tools to encourage UTEN adoption.

Pilot-Scale and Full-Scale Scenarios

The Guidance Order recognized that the costs of these systems will likely decrease as they leverage Pilot learnings and increase in scale.[30] As such, the Company analyzed lifecycle costs of not just the Rockefeller Center Project Pilot, but also of a future Full-Scale (*i.e.,* neighborhood-scale) UTEN built on the Rockefeller Center Project model. The Pilot-Scale scenario begins in 2026, when the Company expects to complete construction of the UTEN Pilot. The Full-Scale scenario begins in 2035, and while it follows the Rockefeller Center Project design (*i.e.,* utilization of waste heat to serve buildings in a dense urban environment), it substantially expands the building area served to spread the fixed costs of UTEN infrastructure across a greater number of users and take advantage of other economies of scale. The Full-Scale scenario is the more accurate representation of the potential costs of UTEN compared to the alternative heating and cooling technologies.

LCA Limitations

While the LCAs quantify many of the costs of heating and cooling solutions, there are several non-quantifiable aspects to electrification that the analyses do not capture:

- In dense areas of Con Edison's service territory, such as Manhattan, electrification using only ASHPs may not be possible due to space constraints. ASHPs for high-rise Manhattan buildings would likely require more roof space for the outdoor equipment to meet the building load than is available;

[30] UTEN Proceeding, UTEN Guidance Order, p. 39.

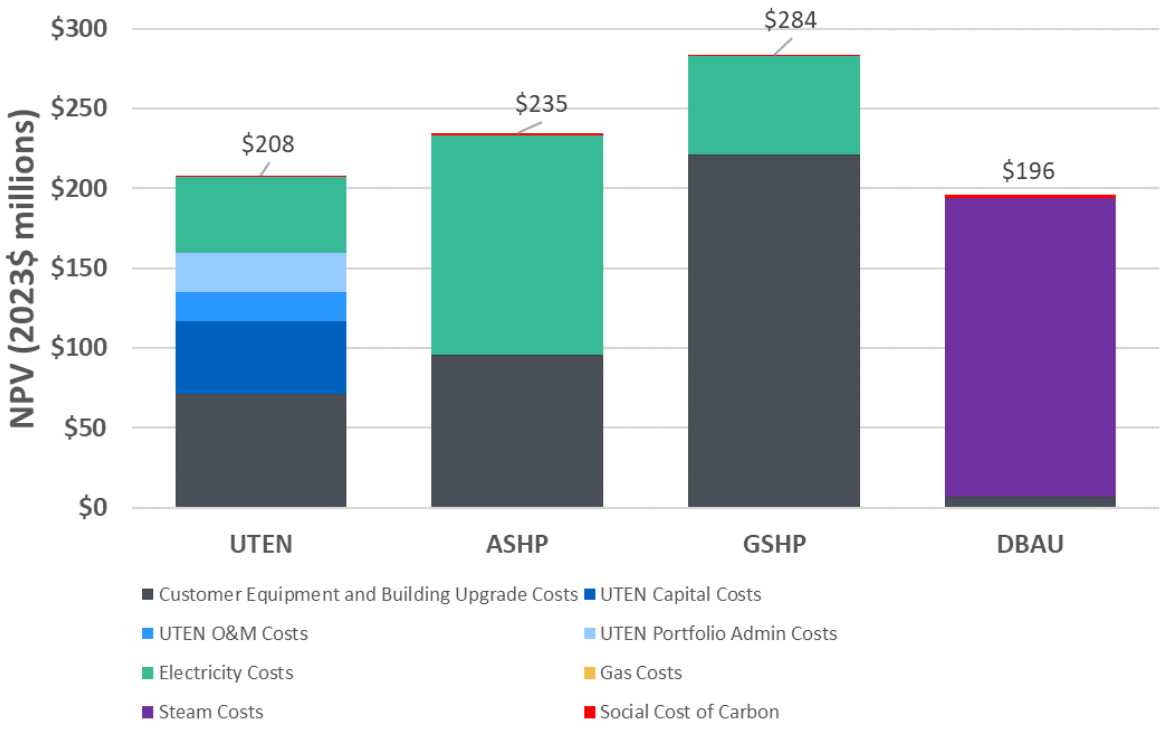
- Upgrading buildings with centralized ASHP water heating likely requires higher cost additional building upgrades that have not been quantified due to limited data;
- Electrification by GSHPs may not be feasible for buildings in dense environments, due to geothermal drilling constraints. Drilling equipment may have to be brought into the basements of buildings, if that is even possible, or there could be constraints on the distance between boreholes that make electrification by GSHPs technically infeasible;
- The electrification system configurations reduce criteria air pollutants by eliminating on-site combustion; however, the societal costs associated with these pollutants are difficult to quantify and are not captured in the LCAs; and
- The DBAU system configuration assumes that low carbon fuels become widely available in New York State. This may or may not be the case in the future.

Results

Societal LCAs for Pilot-Scale and Full-Scale Scenarios

The Societal LCAs show that as a Pilot and as a Full-Scale system, the UTEN is the most societally cost-effective electrification heating and cooling solution. Results are presented and discussed in the charts below, with additional detail provided in Appendix C. Again, the analyses are the net present value at a three percent societal discount rate over an 80-year analysis period.

Figure 5. Pilot-Scale Societal Lifecycle Cost Analysis Results[31, 32]



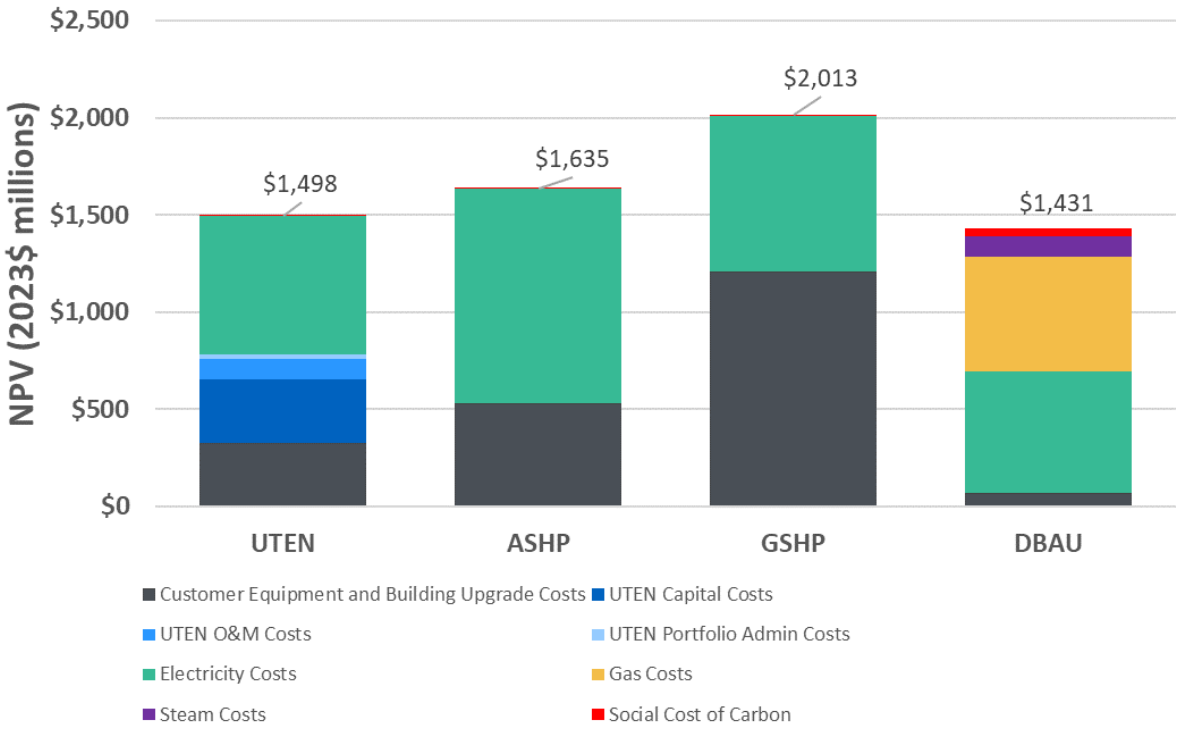
The results of the Pilot-Scale societal lifecycle analyses indicate that UTEN is the lowest cost electrification solution. The UTEN and GSHP have lower Electricity Costs than the ASHP solution because they are more efficient. The UTEN Pilot is still comparable in cost overall to the ASHP solution for several reasons. The UTEN does not benefit from the economies of scale that come from the construction of a larger system serving a much larger square footage of buildings. Second, the Pilot-Scale design includes additional levels of system reliability that will be necessary

[31] UTEN capital costs include loop construction, the Energy Center, heat exchangers, BTU meters, supplemental cooling equipment, and engineering design and implementation. UTEN O&M costs include revocable consent for piping, system maintenance, and energy costs for loop operations. UTEN portfolio administration costs include administrative costs shared among all UTEN projects, including customer operations, billing, UTEN team labor, and central construction support. Customer costs are all costs related to purchase, installation and replacement of customer heating and cooling systems. Electricity, Steam, and Gas costs are the supply and delivery system costs associated with the operation of customer equipment. The Societal analyses exclude state taxes.

[32] No electricity costs appear for the DBAU because the Pilot Scale LCA scenario does not include cooling. Rockefeller Center Project customers have the option to use the UTEN for cooling, but their primary cooling source will be their existing cooling equipment. The Full-Scale scenario does include UTEN cooling.

to attract customers in a Pilot but would not be needed once the design has proven successful. Third, the Pilot includes contingency costs because the Pilot will likely need to solve unanticipated challenges associated with a first-time implementation of the Pilot design. The Full-Scale implementation would benefit from the Pilot having already solved these challenges and would not incur this contingency. Finally, the Pilot-Scale LCA includes certain one-time portfolio administration costs that will not apply to the Full-Scale scenario such as data collection and management, billing system integration, legal support, and consulting services.

Figure 6. Full-Scale Societal Lifecycle Cost Analysis Results[33]



The Full-Scale LCAs show the UTEN as the lowest-cost societal electrification heating and cooling solution, followed by ASHP and then GSHP. The Full-Scale project benefits from economies of scale in larger system serving much larger square footages of connected buildings.

[33] See Footnote 31.

Both system Operations and Maintenance ("O&M") and soft costs like engineering also benefit from additional scale.

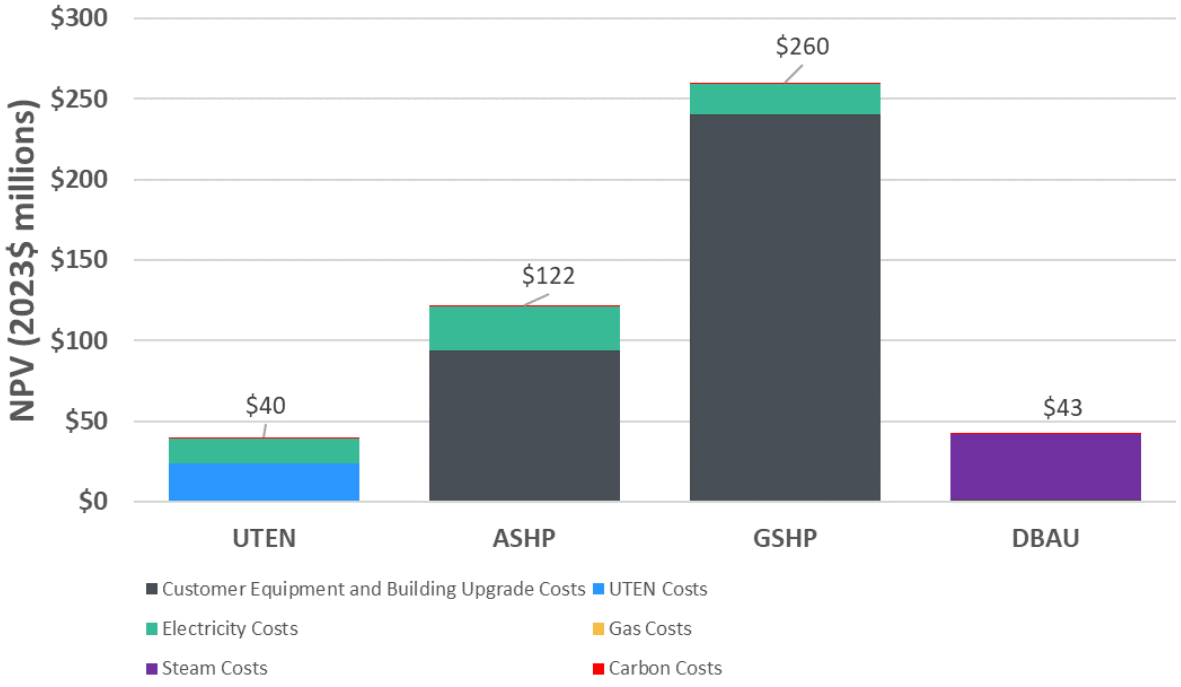
Further, Full-Scale UTEN customer equipment and building upgrade costs are lower than ASHP because ASHP has higher replacement costs over the span of the analysis, and requires configuring high rise buildings with limited roofspace to accommodate the condensers, assuming this is even technically feasible. GSHP costs are much higher because they include the cost of drilling geothermal boreholes in dense Manhattan, again assuming this is even technically feasible. Electricity costs of the UTEN and GSHPs are lower than those of ASHPs because those technology solutions are more efficient, especially during the coldest and hottest days.

Customer LCAs for Pilot-Scale and Full-Scale Scenarios

Results of the Customer LCAs are presented in the charts below, with additional detail provided in Appendix C. The analyses are the net present value of costs at a real blended customer discount rate of 14 percent over the 80-year analysis period.[34] As discussed above, while the Customer perspective analyses can be informative, analyses completed from the Societal perspective should be used as the primary indicator of the value that UTEN projects will provide to New York State relative to other heating and cooling solutions. To encourage customers to adopt the solution with the lowest costs to society, UTEN equipment subsidies could be appropriate tools.

[34] Consistent with rates NYSERDA used in its 2023 *Assessment of Energy Efficiency and Electrification Potential in New York State Residential and Commercial Buildings, Appendix A. See,* https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Building-Stock-and-Potential-Studies/Assessment-of-Energy-Efficiency-and-Electrification-Potential, p. 37. The Company converted rates in the NYSERDA report to real rates using a two percent assumed inflation rate.

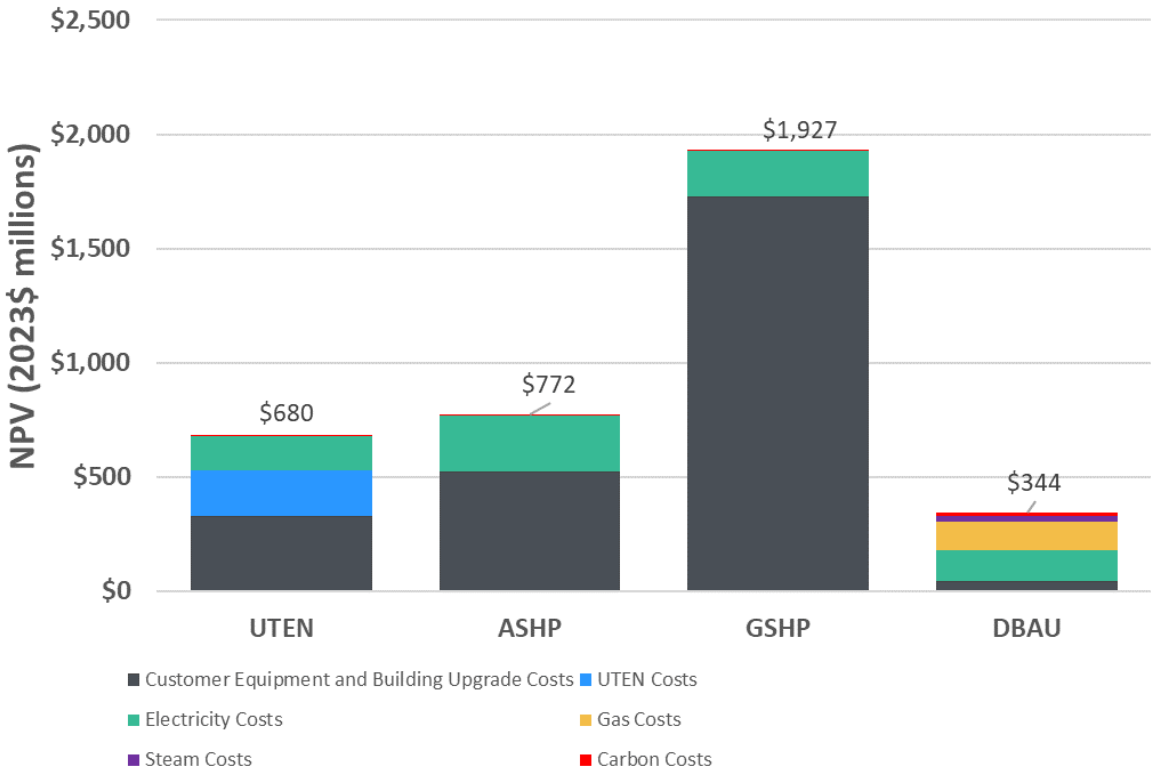
Figure 7. Pilot-Scale Customer Lifecycle Cost Analysis Results[35]



The results of the Pilot-Scale Customer LCAs indicate that customer UTEN costs are lowest compared to the alternative heating and cooling solutions. Both the subsidies that the Pilot provides to cover customer equipment and building upgrades, and the bill cap on the UTEN costs (see Section IX on Rate Design below) largely drive this result.

[35] UTEN costs are the estimated costs of the UTEN that a customer will pay on their UTEN bill, assuming that Con Edison subsidizes rates during the Pilot period and for a transition period of the subsequent 5 years. Customer equipment and building upgrade costs assume that Con Edison subsidizes customer equipment and building upgrades during the Pilot period, with customers paying for replacement costs over the 80-year analysis period. Does include costs that Rockefeller customers will invest in the project. These will be determined during the Design Phase.

Figure 8. Full-Scale Customer Lifecycle Cost Analysis Results



The Full-Scale Customer LCAs show that UTEN is the lowest-cost electrification heating and cooling solution from the Customer perspective, followed by the ASHPs, and then GSHPs. UTENs are the lowest cost because of the smaller upfront investment required in customer equipment and building upgrade costs with the UTEN compared to ASHPs and GSHPs. GSHPs are the most expensive option because they require installation of high-cost ground loops by individual customers. The DBAU case, which requires no upfront building upgrades and has lower upfront equipment costs, appears as the lowest cost option in the Full-Scale model from the Customer perspective.

VIII. COST RECOVERY AND ACCOUNTING TREATMENT

The Company proposes to recover all costs for the Pilot. The Company will treat all capital investments owned by the Company as capital expenditures recovered over the useful lifetime of the assets. Given that this technology will be newly integrated at utility-scale, a generally accepted useful life for UTEN equipment does not currently exist that would enable the Company to assign a particular number of retirement units. As such, the Company will propose average service lives and capitalization requirements for the potential retirement units at a future date.

The Company proposes booking charges that are not typical Company capital expenditures[36] as regulatory assets and amortizing these expenses over 15 years. This generally aligns with the useful life of the customer-sided equipment that would also be partially funded via the Pilot.

The Company proposes to recover costs from electric customers, to better align costs with those customers who will be directly benefitting from the UTEN investment.[37] Potential customers currently heat with many different fuel sources, including district steam, oil, and gas. Electricity is the common energy source for all potential pilot customers. Additionally, wider adoption of thermal energy networks in an electrified future would reduce the peak electric system demand when compared to electrification by ASHPs, helping to manage electric infrastructure needs and benefiting electric customers. Finally, as shown in Table 6 below, recovering the cost of the proposed Pilot would have a lower bill impact than if the Pilot was recovered from gas customers.[38]

[36] *E.g.*, Company labor and buy-downs of customer equipment costs.
[37] As proposed in the January UTEN Proposal, the Company proposes to recover costs from electric customers through the Monthly Adjustment Clause for Company customers and through a surcharge for New York Power Authority customers. Thermal Energy Network Proceeding, January UTEN Proposal, P.p. 17-18.
[38] The rate impact for the pilots and UTENs will, in the longer term, be lower when recovered across the larger electric rate base than the gas rate base and paired with the offsetting impact of increased electricity usage. Thermal Energy Network Proceeding, CECONY and O&R Reply to Party Comments on UTEN Proposals (filed April 24, 2023).

Table 6. Comparison of Estimated Customer Bill Impact[39]

If UTEN Recovered Exclusively From:	Average Bill Impact [%]	Residential Bill Impact [%]
Electric customers	0.10%	0.07%
Firm gas customers	0.38%	0.37%

While the Company intends for the Pilot to be successful and operate its full useful life, this is a first-of-its kind project in New York State and in Con Edison's densely populated service territory. If the Pilot terminates, the Company will recover all undepreciated balances as regulatory assets over a 15-year period.[40]

Pilot customers have expressed that they cannot participate in the Pilot unless alternatives to the Pilot's ongoing operation are available to meet their heating and cooling needs should the Pilot cease operating. Customer costs in this scenario would include the cost to restore heating and cooling after loss of UTEN infrastructure[41] and the write-off of building upgrade investments made specifically for the UTEN. On the utility side, the Company would decommission the UTEN system (*e.g.*, restore facility/property to suitable conditions, dispose of site infrastructure). To enable Pilot participation and address this contingency, the Company shall record these expenses as regulatory assets as incurred and recover them using a 15-year amortization period.[42]

If it were required that the Company exit the Pilot by selling UTEN infrastructure to a customer or third party, the Company proposes that any such proceeds accrue to the benefit of electric customers.

[39] Based upon current estimate of project costs.
[40] For instance, the Company could be forced to end a pilot because of unique construction issues, unforeseen operational problems, or future decisions made in the UTEN proceeding.
[41] The Company is mitigating this potential impact by keeping disconnected existing customer heating and cooling equipment in place wherever possible in its pilot design. Section IV above provides additional detail.
[42] The Company currently estimates the cost to close the Rockefeller Center Project at $7- $15 million. Final estimates will be developed during Stage 2. These costs are not included in the Budget in Section VI.

The Company will pursue the Geothermal and/or Research and Development ("R&D") Investment Tax Credits ("ITCs"), as provided in the Inflation Reduction Act, where eligible.[43] If eligible, the Company will claim the credit(s) in accordance with IRS Normalization rules and provide the benefit to electric customers, when realized.[44]

IX. RATE DESIGN

The Company described three unique conceptual UTEN rate structures to be tested for each of its three proposed pilot projects.[45] By offering multiple rate designs, the Company seeks to learn which rate model(s) will work best across a variety of customer and system design types with opportunities to be replicable at scale.

The Rockefeller Center Project is designed to allow for the sharing of a variety of thermal energy sources between commercial buildings in Midtown Manhattan with highly sophisticated energy plant operations. With this Pilot, the Company will design and test a dynamic rate to support efficient integration and balancing of Thermal Resources and Customers at scale. The conceptual rate has three components: a "temperature-of-use" commodity rate, a fixed monthly contract demand charge and a nominal monthly customer charge.

In order to incentivize efficient dispatch of the various available thermal resources, the Company proposes a novel "temperature-of-use" commodity rate design concept. Under this rate design concept, the price of the thermal energy commodity (measured in dollars-per-MMBTU)

[43] The Rockefeller Center Project is unlikely to qualify for the Geothermal ITC because it does not have geothermal wells.
[44] The Company notes that the ITC is applicable for systems that are in service for five years. If the assets are deemed no longer used or useful within five years of being in service, the Company would be subject to investment recapture. The Company proposes to recover all costs associated with recapture as a regulatory asset.
[45] UTEN Proceeding, May 2023 UTEN Proposal, p. 38.

varies based on the average temperature of the loop. The thermal commodity rate would operate as follows:

- Within a predetermined "temperature deadband", there is no temperature-of-use charge for use of the UTEN loop (exchange of BTUs).
- As loop temperature drops, customers get paid to inject heat to the loop and pay to remove heat.
- As loop temperature increases, customers get paid to extract heat and pay to inject heat to the loop.
- The rate will increase the price as loop temperature moves away in either direction from the ideal operating range. However, the rate will directly or effectively cap the price:
    - When the loop temperature is below the deadband, the price for extracting heat and the payment for injecting heat will be capped at the Company's cost to balance the loop with Con Edison district steam;
    - When the loop temperature is above the deadband, the price for injecting and the payment for extracting heat will be effectively capped because the UTEN customers will retain and can switch to their existing cooling equipment (cooling towers or ice storage). When customers using the loop for cooling see that the price of injecting heat into the loop exceeds the cost of operating their own cooling equipment, the customers will stop using the loop and switch to their own cooling equipment

The Company will test the extent to which the temperature-of-use price signal will result in a loop which requires minimal central balancing and enables efficient compensation of different types of thermal resources in an animated market. While this rate is currently only suitable for sophisticated large commercial customers, it also holds promise for greater participation in the

future because it could be used in a network with any number of consumers, suppliers, or prosumers, any type of thermal source, and any type of services (heating, cooling, and/or DHW). As smart, connected heating and cooling systems become the norm, even smaller customers could have the capability to respond to real-time pricing using automated systems.

Because capacity requirements drive network costs, the Company proposes recovering the network cost and its regulated return though a contract demand charge, which is a monthly charge based on a customer's peak capacity. The monthly customer charge would mirror the Company's electric, gas, and steam rate designs and would offset monthly billing and metering costs associated with the UTEN.

Because Rockefeller Center Project customers will be investing their own capital into UTEN enabling building upgrades, the Company will aim to set the above rates such that they enable a return on investment consistent with that achieved in other long-lived building energy efficiency upgrades in commercial office buildings. As a consequence, revenues from customers participating in the Pilot will not cover the entire pilot-related revenue requirement. For the Pilot, electric ratepayers will contribute the revenue requirement with the UTEN rates offsetting some but not all the UTEN costs (described in Cost Recovery and Accounting Treatment Section VIII).

X. METRICS

The Company proposes to track and measure the Pilot's successes based on the performance metrics detailed below. The Company will work with DPS Staff and other stakeholders to refine these metrics in upcoming technical conferences.[46]

Table 7. UTEN Project Metrics

Metrics Category	Metrics
Technical	• Frequency and duration of time the UTEN system is operating outside of defined temperature and flow ranges • System electricity consumption, normal operation vs. peak • Asset tracking of UTEN infrastructure (*i.e.,* pipe sizes, materials, age, commodity) • Frequency and duration that backup/emergency heating is required for the customer and system

Financial	• Company's operating expenses required to balance the UTEN system
	• Company's capital expenses
	• Cost of customer equipment and building upgrades paid for by Pilot
	• UTEN customer expenses
	  ○ Comparison of UTEN system cost to individual customer-owned geothermal or air source heat pump installations
	  ○ Cost performance with varying levels of energy efficiency upgrades, if applicable
	  ○ Customer bill impacts of the UTEN compared to previous energy costs, including calculation of what bills would be without Bill Protection
	• Company's capital expenses on a:
	  ○ Per customer basis
	  ○ Per unit output basis
	  ○ Maximum system output basis
	• Company's system operating expenses on a:
	  ○ Per customer basis
	  ○ Per unit output basis
	  ▪ Maximum system output basis

[46] Per the UTEN Guidance Order, the Company will include standardized performance metrics that will be incorporated into the Company's Final UTEN Pilot Project Engineering Design and Consumer Protection Plan filings. Metrics reporting will occur on a quarterly basis or as determined by the Commission if the Company receives approval to begin construction on the Pilot in Stage 3 and receives approval to operate the Pilot in Stage 4.

Customer / Societal	• Customer/tenant satisfaction surveys • Impact of energy efficiency upgrades to the UTEN, if applicable • Change in customers' total energy costs after converting to the UTEN • Call center queries (number, concern, resolution, and time to resolution) • Number of customers exiting or entering the Pilot after construction is complete • Calculated site emissions of Customers • UTEN calculated system emissions • Billing accuracy and timeliness • Customer complaints • Customer engagement
Safety / Reliability	• OSHA Incident Rate for UTEN related work • Contractor damages • Rules We Live By (RWLB) violations • Number of leaks reported on the system • Number of customer outages • Duration of customer outages

XI. PRELIMINARY CUSTOMER PROTECTION PLAN

The Company's preliminary Customer Protection Plan, including structure, customer agreement template, and customer engagement activities, are detailed below.

Plan Structure and Customer Agreement Template

A representative, but not exhaustive, list of customer protections, customer rights, and responsibilities, as well as issues that will need to be addressed in the Final Customer Protection Plan and Final Customer Agreement Template for the proposed Pilot, are below. Where applicable customer rules and protections will align with provisions in Parts 11 and 13 of 16 NYCRR Chapter 1 Subchapter B, as well as the Company's Electric, Gas, and Steam Tariffs.

- **Eligibility for Service –** The Company will determine eligibility for service based on the scope of the Pilot and will engage with select customers in the Pilot territory.

- **Obtaining Service –** The Company will identify and contact customers eligible to participate in the Pilot.
- **Minimum Documentation –** The Company will establish the minimum documentation necessary for customer enrollment.
- **Customer Consent and Privacy –** The Company will address customer consent and privacy in the Customer Agreement.
- **Deposit –** The Company and the customer will agree on the requirements, if any for new account deposits.
- **UTEN Service Request –** The Company will collaborate with participating customers to quantify the service need from the UTEN system.
- **Parameters and Length of Service –** The Company and customer will agree on a specified length of time for the Company to provide service through the UTEN.
- **UTEN Service Commitment –** The Company and customer will agree upon the Company's service responsibilities for predictable operation.
- **Existing Electric, Gas, & Steam Service –** The Company will work with the customer to identify what new electric service is needed for UTEN equipment via the Company's existing processes for establishing and/or upgrading services. The Company will also maintain existing gas and steam service to the customer.
- **Waste Heat –** The Company will enter into an agreement with the customer for access and use of the customer or third-party owned thermal resource to transfer energy to the Company's thermal energy network.
- **UTEN Rates –** The Company will establish a defined rate structure with Commission approval and communicate that structure to the customer.

- **Metering –** The Company will determine how the UTEN service will be metered and how meter data will be relayed back to Con Edison.
- **Billing –** The Company will establish a billing process that will address items such as billing cadence, content of bills, back billing, late payment charges, and other fees approved by the Commission.
- **Payments –** The Company will establish a payment process that will address payment issues such as payment methods, conditions of payment extensions, and deferred payment agreements.
- **Pricing Options –** The Company will provide pricing options and bill protections to minimize the risk of higher energy bills. See Section IX for more details.
- **Arrears –**The Company will establish provisions for arrears that align, to the extent applicable, with provisions for arrears in existing regulations and the Company's Electric and Gas Tariffs.
- **Special Services (LSE, EBD, MEDH) –** The Company will establish provisions for special services, which include but are not limited to life sustaining equipment ("LSE"), assistance for the elderly, blind, and disabled ("EBD"), and those who are facing medical hardship ("MEDH").
- **Additional Services for a Fee –** The Company will identify any additional services that may be offered to customers for a fee**.**
- **Customer Complaints –** The Company will establish a process for participating customers to submit formal complaints regarding UTEN construction, operation, customer experience, and other related issues to the Company.

- **Clear Access Requirements –** The Company and customer will agree on the requirements for clear access to Company equipment that align, to the extent applicable, with clear access requirements in the Company's Electric and Gas Tariffs.
- **Company's Right to Access Company Equipment –** The Company and customer will agree on the terms and conditions for accessing Company equipment.
- **Outages –** The Company will implement system reliability backup options to address potential outages. The Company will identify additional measures to address potential outages during the Pilot Project Engineering Design portion of the Pilot.[47]
- **Emergency/Safety –** The Company will establish safety procedures to safely deliver thermal energy and protect customer equipment and buildings.
- **Terminations –** The Company and the customer will agree on the process, conditions, and customer protections for termination of service in accordance with provisions in the Company's Electric and Gas Tariffs and State regulations for Electric, Gas, and Steam service.
- **Reconnections –** The Company and customer will agree on the process, conditions, and customer protections for restoration of service consistent with State regulations for Electric, Gas, and Steam service.
- **Early Exit Provisions –** The Company and customer will agree to provisions that address what happens if or when a customer's participation in the Pilot ends, prior to the end of the agreed length of service.

[47] The Company will implement system reliability backup options. To manage any temporary outage of recycled waste heat, a Con Edison steam shell and tube heat exchanger will be installed and connected to the UTEN loop.

- **Pilot Closure –** The Company and the Customer will agree to provisions to address what happens when the Pilot ends, per any requirements issued by the Commission. To protect customers if the Rockefeller Center Project is unwound at the end of the Pilot period, the Company could:
  - Sell the complete UTEN system to a third party or to one of the major customers on the system which would continue to provide the UTEN service; or
  - Decommission the UTEN infrastructure in the public right of way and sell the loops on Tishman Speyer-owned property to Tishman Speyer, who would continue to deliver waste heat just to Tishman Speyer's 1230 6th Avenue and 600 5th Avenue buildings. Rockefeller Group's building, 1221 Avenue of the Americas, would replace the Water Source Heat Pumps with a steam-driven chiller.

Customer Engagement Plan

The Company prioritizes community engagement as an important aspect of UTEN deployment and recognizes the importance of being proactive in understanding the needs and priorities of customers, residents, tenants and affected communities. The Company estimates a customer engagement budget of $160,000 for the Rockefeller Center Project (included in the Pilot budget detailed above), which would include but would not be limited to funding for in-person engagement and outreach materials to increase access to Pilot offerings and project information. The Company will also continue to build relationships with Pilot participants, including Tishman Speyer, Ecosystem, and AKF Engineering. The Company will develop a Final Customer Engagement Plan tailored to meet the needs of the community served by the Rockefeller Center Project. During Stage 2 of the Pilot, the Company will commence outreach efforts with individual tenants in buildings connecting to the UTEN. Engagement with customers will initially focus on

background and education about UTENs. It will then evolve into education about how the UTEN benefits and affects both Pilot participants and elements of the Customer Protection Plan. Additionally, the Company will host a series of webinars and in-person community information sessions to ensure customer awareness and understanding of all elements of the Customer Protection Plan.

Outreach, Education, and Recruitment Plan

The Company is committed to transparency in sharing the goals, objectives, project schedule, status, and impacts of the Rockefeller Center Project with community stakeholders. Stakeholders for the Pilot may include: individual tenants, elected officials; local chambers of commerce; business improvement districts; local development corporations; not-for-profit community-based organizations; government entities; community housing associations; block associations; tenant associations; and residents living in the surrounding areas. The Company hopes to cement strong relationships with these key stakeholders throughout the lifetime of the Pilot. To achieve this, the Customer Engagement Plan will include various methods of outreach, such as:

- Convening in-person community information sessions and town halls open to the public;
- Hosting online webinars to answer questions from the public, including questions on the Customer Protection Plan;
- Sending information packets in various languages to all households;
- Placing public signage describing Pilot updates in affected buildings;
- Press releases;
- Promoting the Pilot through virtual platforms, such as a dedicated web page and social media posts;

- Work notifications detailing construction projects that may impact the community; and
- Information on UTEN construction, as needed.

The Company will display signage highlighting the UTEN system within public areas of Rockefeller Center, which has millions of visitors every year. In addition, the Company will coordinate with Tishman Speyer on educational tours of Energy Center equipment and infrastructure, most of which will be located within the Rockefeller Center Central Plant. Such tours and training will showcase UTEN technologies at the utility scale, providing educational opportunities for residents and the local community.

In addition to the outreach methods listed above, the Company will use marketing tactics to secure customer support for the Pilot. For example, the Company may:

- Print collateral materials, such as brochures, flyers, and doorhangers, that explain the benefits of UTEN technologies, such as energy savings and lower carbon emissions. These materials should be distributed to tenants and building owners in the targeted areas, as well as local businesses, schools, local government and other community partners.
- Include signage at UTEN work sites with the Company logo and the UTEN project name, along with a QR code that links to a dedicated webpage. The signage should indicate that the work site is part of a clean energy initiative that supports City and State goals and should be visible and attractive to tenants, customers, building owners and passersby.

The Company recognizes language accessibility as a priority for participation in the clean energy transition. Public Service Law §44(4) directs that vital documentation be made available to customers in additional languages in cases where greater than 20 percent of the population in a

county speaks a language other than English.[48] While the UTEN customers of record in the Rockefeller Center Project will be large commercial buildings, not individual tenants, the Company will apply the Public Service Law requirement to the information it provides to tenants as well. Materials at a minimum will be available in both English and Spanish, and the Company will also evaluate use of other languages as needed.[49]

The Company values the role that community-based organizations ("CBOs") can play in building trust and fostering collaboration between the Company and the neighborhood's residents. The Company will work with CBOs as needed to align the Pilot with the community's needs. Some of the ways that the Company may work with CBOs are:

- Inviting CBOs to provide feedback and input on the Pilot implementation.
- Supporting CBOs in their outreach and education efforts to inform and engage customers and residents about the Pilot and its benefits.
- Partnering with CBOs to host community events, where the Company can showcase the UTEN technologies and answer any questions or concerns from the community.

Con Edison is committed to providing excellent customer service and support to customers, residents and tenants who participate in the Pilot. Throughout the operation of the Pilot, the Company intends to conduct customer satisfaction surveys which will be evaluated throughout the duration of the Pilot and included as part of the Pilot Close-Out Report. Following project close-out, the Company will conduct a customer satisfaction survey to collect feedback and suggestions on the Pilot and its impacts. The Company will also email customers the Pilot Close-Out Report

[48] N.Y. Public Service Law § 44(4). Spanish is the only language that meets these thresholds in Con Edison's service territory.
[49] *See*, Population and Languages of the Limited English Proficient ("LEP") Speakers by Community District | NYC Open Data (cityofnewyork.us).

that summarizes the Pilot's achievements, benefits, and challenges, as well as recommendations for future improvements and opportunities.

In addition to all the methods listed above, the Company welcomes any suggestions or recommendations on Outreach, Education, and Recruitment for the Pilot via public comment.

APPENDIX A – TECHNICAL DRAWINGS

Figure A.1. Manhattan Project Locations

Figure A.2. Rockefeller Center Project Building Locations

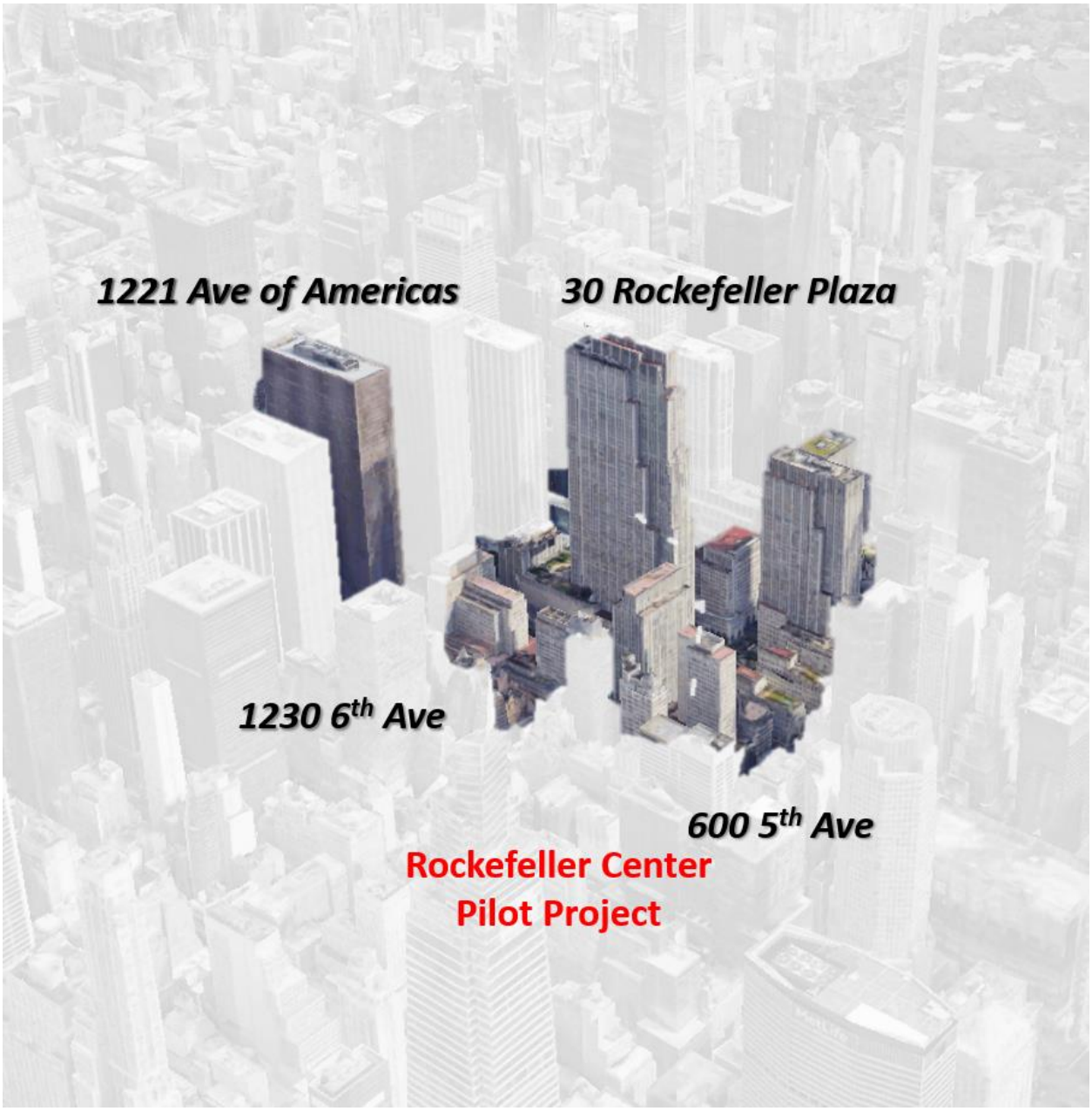


Figure A.3. Elements of the Rockefeller Center Project UTEN

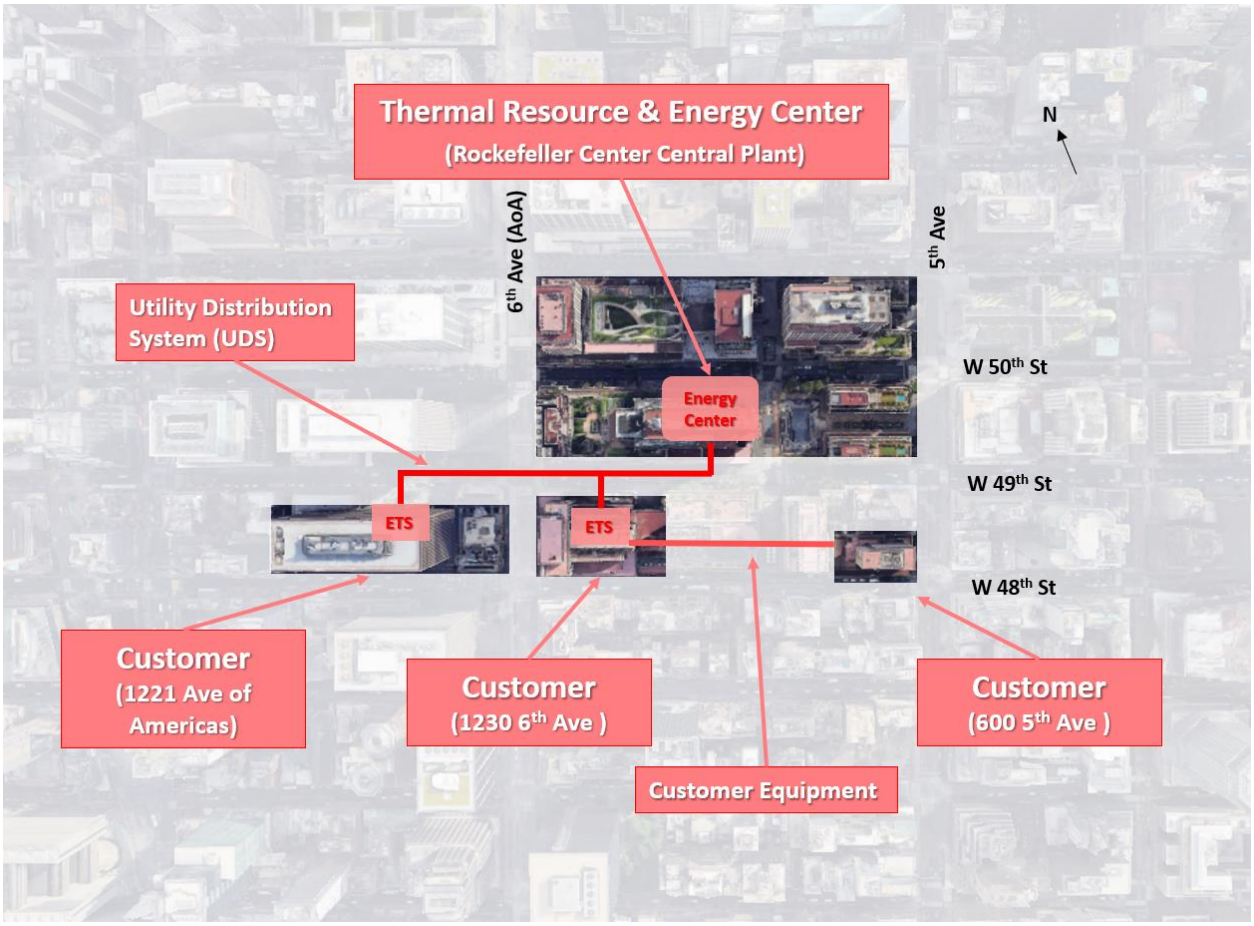
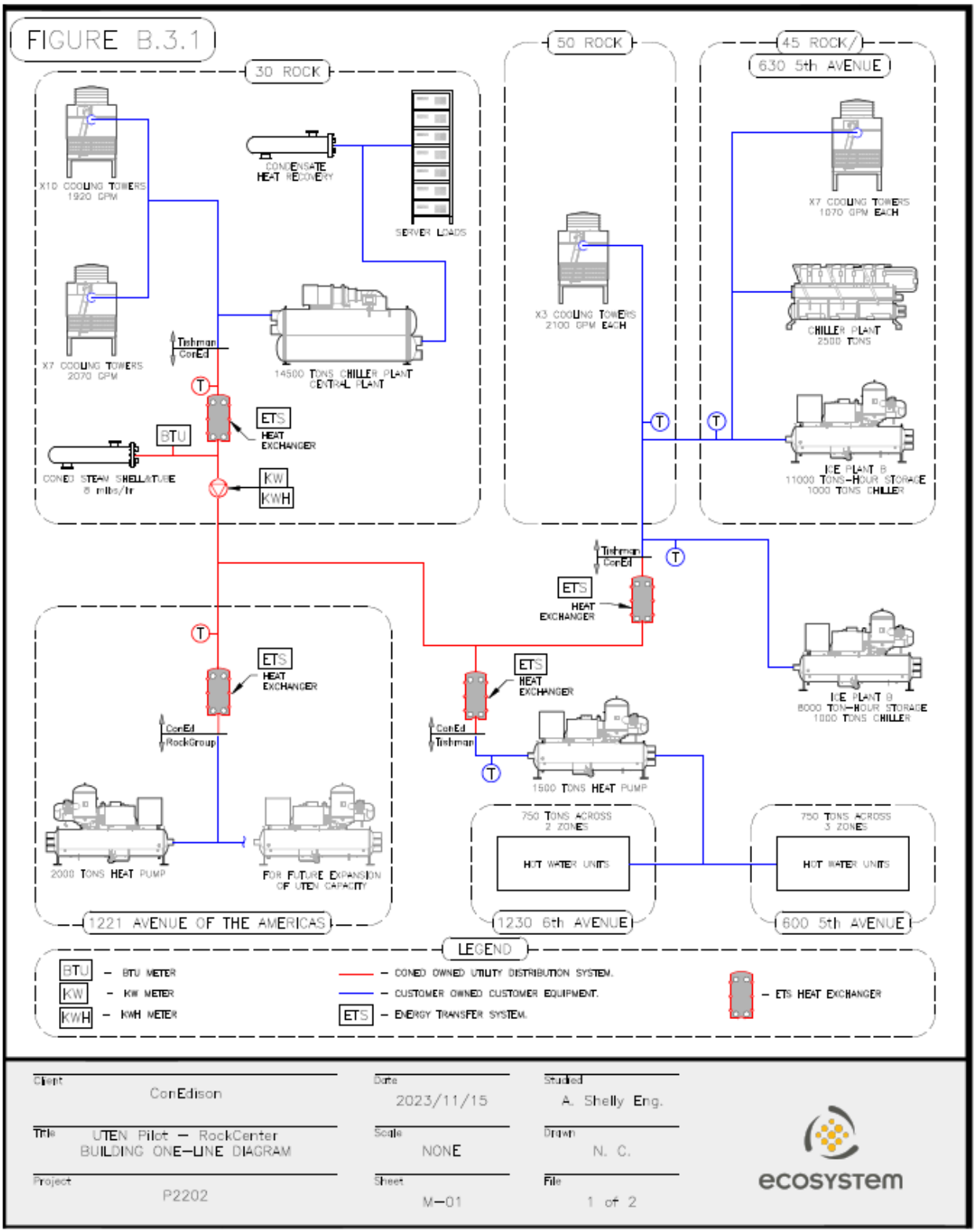


Figure A.4. Rockefeller Center Project Building One-Line Diagram



APPENDIX B – LETTERS OF SUPPORT

B.1. Tishman Speyer Rockefeller Center Project Letter of Support

RCPI Landmark Properties, L.L.C.

45 Rockefeller Plaza, 7th Floor
New York, NY 10111

ROCKEFELLER CENTER®

January 13, 2023

Dear Con Edison,

Rockefeller Center would like to provide this letter as a statement of support for Tishman Speyer's submission for the Utility Thermal Energy Network Pilot Project. We see this as a great opportunity to reduce greenhouse gas emissions in New York City and increase the value of our operating assets.

Our staff operates and maintains a district energy network that cools 11 buildings and hundreds of tenants. The center operates 24/7 with preventative maintenance scheduled to avoid any down time in providing year-round cooling. Our tenants have extremely critical file servers, broadcast equipment, and events often attended by heads of state. With multiple chiller plants and ice storage plants in operation, dispatch must be carefully coordinated to ensure maximum efficiency and mechanically sound operation.

NYSERDA is also working with us to implement the largest Real Time Energy Management program in the state. With our recent BMS upgrade, we have the ability to trend and analyze over 10,000 data points, and are happy to cooperate and help on any measurement and verification the Con Edison may deem necessary.

We look forward for the opportunity to expand our operation to include the export of heat to our neighbors.

Thank you,

Matthew Sheridan – Energy Manger for Rockefeller Center

917-975-7032

B.2. Rockefeller Group Rockefeller Center Letter of Support

ROCKEFELLER
GROUP

May 16, 2023

Greg Koumoullos
Project Manager – Thermal Energy Networks
Con Edison
4 Irving Pl, NY, NY

Dear Mr Koumoullos,

Rockefeller Group would like to provide this letter as a statement of support for the Utility Thermal Energy Network Pilot Project proposed for Rockefeller Center and the Avenue of the Americas corridor. We see this as a great opportunity to reduce greenhouse gas emissions in New York City, and more specifically at our building 1221 Avenue of the Americas.

Rockefeller Group studied decarbonization strategies for our Rockefeller Center properties along Avenue of the Americas, consisting of over 4.5M SF multi-tenant office space. These evaluations were to determine operational and capital strategies to meet our carbon reduction goals as well as the goals of our tenants which include White & Case, Deloitte, NBCU, SiriusXM.

We see great potential for utilizing the Con Edison Thermal Energy Network to help us decarbonize 1221 Avenue of the America's heating system and help overcome barriers related to installing air-sourced heat pumps on our building. If the pilot is successful and the network expands, we would be interested in learning how we could also potentially become a heat injection contributor for the Con Edison Thermal Energy Network.

We envision next steps after NYS PSC approval will include further evaluation of the program specifics to confirm the mutual benefits of the program. This could then lead to contract review and negotiation, public relations coordination, and our mutual commitment to capital required for our portion of the pilot project.

We are very hopeful this monumental project will be approved shortly so we can maintain momentum to accelerate decarbonization for 1221 Avenue of the Americas.

Sincerely,

Ryan P. Malin, PE, LEED AP

Vice President Design & Construction Core Holdings

Rockefeller Group

1271 Avenue of the Americas, 24th Floor, New York, NY 10020 | RockefellerGroup.com

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

B.3. Barclays Rockefeller Center Letter of Support

Secretary Michelle L. Phillips
New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

July 11, 2023

Dear Secretary Phillips:

The Barclays team at 745 7th Avenue, New York, NY 10019 respectfully submits a letter of support seeking Commission approval of Con Edison's proposed utility-owned thermal energy network (UTEN) project at Rockefeller Center per its May 19, 2023 filing.[1] UTENs will help New York State meet its climate and equity goals. Con Edison's approach of selecting three unique and distinct projects including Rockefeller Center, as well as funding two feasibility studies, will be critical in determining the viability and scalability of UTENs across all building typologies downstate as New York moves towards electrification and decarbonization.

The Rockefeller Center UTEN pilot project proposed by Con Edison will provide real climate benefits to New York City. The project has the potential to reduce greenhouse gas emissions while removing and recycling waste heat. It will test waste heat recovery from a variety of heat sources without the use of boreholes, which will be critical to understanding the applicability of UTENs in a dense, urban environment where boreholes can be technically infeasible or cost prohibitive. This project has the potential to unlock efficient new pathways to decarbonization and local law compliance for high-rise, commercial buildings that make up a majority of Manhattan.

The Rockefeller Center location is a New York City landmark, surrounded by similar high-rise, commercial buildings with opportunities for network to scale. The project connects multiple buildings and associated ownership entities at a district scale that would not have been possible absent a utility-owned business model. We are very interested to see how the proposed project progresses and may be interested in joining a UTEN in the future should it prove successful in demonstrating its operational capabilities and business model.

We urge the Commission to approve the proposed Rockefeller Center UTEN pilot project so that Con Edison can gather sufficient learnings on UTENs in New York City to help the State and the City meet their ambitious clean energy goals.

Thank you for your consideration,

Paul Goodian

VP Building Operations and Environmental Lead for the Americas

[1] Case 22-M-0429, *Proceeding to Implement the Utility Thermal Energy Network and Jobs Act*, Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals (filed May 19, 2023).

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

B.4. NYLCV Rockefeller Center Project Letter of Support

Secretary Michelle L. Phillips
New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

July 6th, 2023

Dear Secretary Phillips:

The New York League of Conservation Voters respectfully submits a letter of support seeking Commission approval for Con Edison's proposed portfolio of utility-owned thermal energy network (UTEN) projects per its May 19, 2023 filing.[1] UTENs will help New York State and New York City meet their climate and equity goals. Con Edison's approach includes pilot projects, as well as funding for feasibility studies, which will be critical in determining the viability and scalability of UTENs across all building typologies downstate as New York moves towards electrification and decarbonization.

Working with our coalition partners across the state, NYLCV helped to pass the Utility Thermal Energy Network and Jobs Act ("UTENJA") in 2022. Our long-term goal in supporting this legislation is to move New York's buildings strategically off of fossil fuels at a speed and scale commensurate with our climate mandates while protecting energy access, reliability, and affordability as we preserve and expand the skilled workforce required to make an equitable transition to clean energy.

The UTEN pilot projects proposed by Con Edison will provide real climate benefits to New York City and Westchester. The portfolio of projects will reduce greenhouse gas emissions while recycling waste heat. The pilots are also estimated to reduce impacts to the electric system when compared to full electrification of the selected participating buildings with air source heat pumps. New York State must explore and deploy a variety of clean heat solutions to achieve its climate goals, and UTENs are an efficient means of electrification, creating more pathways for decarbonization.

We are hopeful that the proposed pilots will be of significant long-term benefit for the communities they will serve and provide critical training for skilled union jobs as well as a pipeline for future employment opportunities. Two of the projects will be serving disadvantaged communities and low-income housing. This is an opportunity to include disadvantaged communities in the clean energy transition and to cover the costs of large infrastructure and energy efficiency projects that these buildings might not otherwise be able to afford.

[1] Case 22-M-0429, *Proceeding to Implement the Utility Thermal Energy Network and Jobs Act*, Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals (filed May 19, 2023).

We urge the Commission to approve the three proposed UTEN pilot projects so that Con Edison can gather sufficient learnings on UTENs in the NYC and Westchester areas to help the State meet its ambitious climate and equity goals.

Thank you for your consideration,

Sincerely,

Julie Tighe
President, NYLCV

B.5. Quebec Government Office Rockefeller Center Project Letter of Support

GOUVERNEMENT DU QUÉBEC
QUÉBEC GOVERNMENT OFFICE
NEW YORK

July 10th, 2023

Secretary Michelle L. Phillips
New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

Dear Secretary Phillips,

As you may know, the Quebec Government Office in New York shares and supports New York State's ambitious climate goals. As friends and neighbors, our people, communities, institutions, companies, and governments collaborate every day to reduce greenhouse gas emissions and accelerate the transition to a greener economy. This is why we wanted to inform you that we applaud initiatives like the one linked to the pilot projects proposed by utilities to implement the 2022 Thermal Energy Network and Jobs Act. We hope that the approved pilot projects will reduce greenhouse gas emissions and provide real climate benefits to New York.

One of the pilot projects – the Rockefeller Center Project proposed by Con Edison, Tishman-Speyer, AKF Engineering, and Ecosystem – is particularly close to our hearts. Rockefeller Center is not only one of New York City's most iconic landmarks, but it has also been Quebec's home in New York for the past 83 years, as we are still one of the last remaining original tenants. We hope projects like this one will unlock efficient new pathways to decarbonize high-rise commercial buildings in dense urban environments.

We look forward to continued collaboration and to the successful implementation of initiatives such as these, which contribute to our shared commitment towards a sustainable and greener future. Please do not hesitate to reach out to us if we can be of any help in making this project a great example of decarbonization success.

Yours sincerely,

Martine Hébert, Delegate General, Quebec Government Office in New York

Québec Government Office
One Rockefeller Plaza, 26th Floor
New York, NY 10020-2102 USA
Phone: 212 843-0950 • Fax: 212 376-8983
Québec.ca/new-york

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

B.6. Hippodrome Building Rockefeller Center Project Letter of Support

HIPPODROME
NYC

Secretary Michelle L. Phillips
New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

July 7, 2023
Dear Secretary Phillips:
The Hippodrome Building at 1120 Avenue of Americas respectfully submits a letter of support seeking Commission approval of Con Edison's proposed utility-owned thermal energy network (UTEN) project at Rockefeller Center per its May 19, 2023 filing.[1] UTENs will help New York State meet its climate and equity goals. Con Edison's approach of selecting three unique and distinct projects including Rockefeller Center, as well as funding two feasibility studies, will be critical in determining the viability and scalability of UTENs across all building typologies downstate as New York moves towards electrification and decarbonization.
The Rockefeller Center UTEN pilot project proposed by Con Edison will provide real climate benefits to New York City. The project has the potential to reduce greenhouse gas emissions while removing and recycling waste heat. It will test waste heat recovery from a variety of heat sources without the use of boreholes, which will be critical to understanding the applicability of UTENs in a dense, urban environment where boreholes can be technically infeasible or cost prohibitive. This project has the potential to unlock efficient new pathways to decarbonization and local law compliance for high-rise, commercial buildings that make up a majority of Manhattan.
The Rockefeller Center location is a New York City landmark, surrounded by similar high-rise, commercial buildings with opportunities for network to scale. The project connects multiple buildings and associated ownership entities at a district scale that would not have been possible absent a utility-owned business model. We are very interested to see how the proposed project progresses and may be interested in joining a UTEN in the future should it prove successful in demonstrating its operational capabilities and business model.
We urge the Commission to approve the proposed Rockefeller Center UTEN pilot project so that Con Edison can gather sufficient learnings on UTENs in New York City to help the State and the City meet their ambitious clean energy goals.

Thank you for your consideration,
Daniel Kaye

[1] Case 22-M-0429, *Proceeding to Implement the Utility Thermal Energy Network and Jobs Act*, Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals (filed May 19, 2023).

B.7. Council Member Keith Powers Rockefeller Project Letter of Support

KEITH POWERS
COUNCIL MEMBER, 4TH DISTRICT

211 East 43rd Street, Suite 1205
New York, NY 10017
Tel: (212)818-0580

250 Broadway, Suite 1833
New York, NY 10007
Tel: (212)788-7393

THE COUNCIL OF THE
CITY OF NEW YORK

MAJORITY LEADER

CHAIR
Rules, Privileges, and Elections

COMMITTEES
Finance

July 6, 2023

Secretary Michelle L. Phillips
New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

Dear Secretary Phillips:

I am writing today as the NYC Council Representative for the Rockefeller Center area. I respectfully submit this letter of support seeking Commission approval of Con Edison's proposed utility-owned thermal energy network (UTEN) project at Rockefeller Center per its May 19, 2023 filing. UTENs will help New York State meet its climate and equity goals. Con Edison's approach of selecting three unique and distinct projects, including the Rockefeller Center, and funding two feasibility studies will be critical in determining the viability and scalability of UTENs across all building typologies downstate as New York moves towards electrification and decarbonization.

The Rockefeller Center UTEN pilot project proposed by Con Edison will provide real climate benefits to New York City. The project has the potential to reduce greenhouse gas emissions while removing and recycling waste heat. It will test waste heat recovery from a variety of heat sources without the use of boreholes, which will be critical to understanding the applicability of UTENs in a dense, urban environment where boreholes can be technically infeasible or cost prohibitive. This project has the potential to unlock efficient new pathways to decarbonization and local law compliance for high-rise, commercial buildings that make up a majority of Manhattan.

The Rockefeller Center location is a New York City landmark, surrounded by similar high-rise, commercial buildings with opportunities for network to scale. The project connects multiple buildings and associated ownership entities at a district scale that would not have been possible absent a utility-owned business model.

I urge the Commission to approve the proposed Rockefeller Center UTEN pilot project so that Con Edison can gather sufficient learnings on UTENs in New York City to help the State and the City meet their ambitious clean energy goals.

Sincerely,

Keith Powers
NYC Council Member, District 4

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

B.8. IGSHPA Rockefeller Center Letter of Support

INTERNATIONAL GROUND SOURCE HEAT PUMP ASSOCIATION
312 S. 4th Street, Suite 100
Springfield, Illinois 62701 USA
igshpa.org • 1-800-626-4747 • info@igshpa.org

July 3, 2023

Secretary Michelle L. Phillips
New York State Public Service Commission
Empire State Plaza
Agency Building 3
Albany, NY 12223-1350

Dear Secretary Phillips:

The International Ground Source Heat Pump Association (IGSHPA), a 501(C)(6) non-profit, providing training, standards, and support for the ground source heat pump technology since 1987, respectfully submits a letter of support seeking Commission approval for Con Edison's and Orange and Rockland Utilities' (O&R's) proposed portfolio of utility-owned thermal energy network (UTEN) projects per their respective May 19, 2023 filings.[1] UTENs will help New York State and New York City meet their climate and equity goals. Con Edison's portfolio includes three unique and distinct projects and two feasibility studies; O&R proposes one project and a feasibility study. Approval of all projects and associated budget will be critical in determining the viability and scalability of UTENs across all building typologies downstate as New York moves towards electrification and decarbonization.

The UTEN pilot projects proposed by Con Edison and O&R will provide real climate benefits to New York City and the State. The portfolio of projects will reduce greenhouse gas emissions while recycling waste heat. The pilots are also estimated to reduce impacts to the electric system when compared to full electrification of the selected participating buildings with air source heat pumps. New York State must explore and deploy a variety of clean heat solutions to achieve its climate goals, and UTENs are an efficient means of electrification, creating more pathways for decarbonization.

These projects will also be good for the community. Two of Con Edison's projects and O&R's project will be serving disadvantaged communities and low-income housing. This is an opportunity to include disadvantaged communities in the clean energy transition and cover the costs of large infrastructure and energy efficiency projects that these buildings might not otherwise be able to afford. We urge the Commission to approve Con Edison's and O&R's proposed UTEN pilot projects so that the companies can gather sufficient learnings on UTENs in the New York City, Westchester, and Hudson Valley areas to help the State meet its ambitious climate and equity goals.

Thank you for your consideration,

Jeff L. Hammond
Executive Director
jhammond@igshpa.org

B.9. REBNY and NYECC Rockefeller Center Letter of Support

REBNY
Real Estate Board of New York

nyecc
NEW YORK ENERGY CONSUMERS COUNCIL

June 30, 2023

To Whom it May Concern:

In order to help comply with the 2022 Thermal Energy Network Jobs Act, in September of 2022, the Public Service Commission (PSC) ordered the State's seven largest utilities to propose at least one utility-owned thermal energy network (UTEN) pilot project. "The Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals" filing with the PSC is Con Edison's most recent effort to fulfill their commitment to move UTEN pilots forward. The document proposes three pilots that are ready to move forward, and two that need additional study, but that are likely to also be viable. The Real Estate Board of New York (REBNY) and the New York Energy Consumer Council (NYECC) is writing in support of these proposals.

The role of these pilots, broadly speaking, is to learn more about the development of UTENs and to evaluate their potential to meet a number of State climate goals. These goals include reducing emissions, minimizing the amount of work electrifying buildings, environmental equity, and a just and fair transition away from fossil fuels, which includes workforce development in new technologies.

The projects proposed by Con Edison address all of these goals, and they do so while including a large and diverse building stock. Collectively the pilots will engage 85 buildings covering 4.3 million square feet of floorspace and about 570 housing units. Two of the three projects are in disadvantaged communities, while the third takes on the challenge of servicing three large Manhattan commercial buildings. Of the two potential other pilots, one is in a disadvantaged community.

These proposed projects also include unique rate structures to assure customers, especially those in disadvantaged communities, pay lower rates than they do now. The pilots include upgrading buildings through adding insulation and plugging leaks so that they require less heating and cooling. Finally, the proposals include job training, with a focus on the local workforce.

The Chelsea Pilot Project, submitted by the Zero Carbon Mile Consortium consisting of Reshape Strategies and Related Companies, will capture heat from a data center and use it to provide heat, cooling, and hot water to four nearby NYCHA multifamily buildings. The Mount Vernon Pilot was developed by Con Edison and their consultants. It would service 76 buildings in a disadvantaged community via a geothermal system which will provide heating, with cooling and hot water available for buildings with certain configurations. The Rockefeller Center Project was proposed by Tishman-Speyer, AKF Engineering, and Ecosystem. It will use clean recycled waste heat from multiple building systems to meet year-round heating needs for two buildings and multiple heating loads in a third, with cooling as an option.

REBNY
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nyecc
NEW YORK ENERGY CONSUMERS COUNCIL

The goals of this State-wide pilot program are critical to meeting the emissions reduction mandates at the State and local level in an efficient way. The specific pilots Con Edison has selected meet those goals in creative and sophisticated ways. Therefore, REBNY and NYECC would encourage that they move forward expeditiously.

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APPENDIX C – LIFECYCLE ANALYSES

As discussed in Section VII, the Company conducted several lifecycle cost analyses of the Rockefeller Center Project. The methodology, key assumptions, and detailed results are included in this Appendix.

Characterization of the Full-Scale UTENs

To conduct the lifecycle cost analyses for the Full-Scale version of the Rockefeller Center Project, the Company developed a high-level design for a future Full-Scale (neighborhood-level) UTEN scenario. This included estimates of the customer footprint, types of thermal resources, and heating and cooling loads that would be served. The Full-Scale model increases the total gross floor area and UTEN system footprint for the Rockefeller Center Project to simulate a larger network. Additionally, the Full-Scale model increases the diversity of customer types on the network to realize economies of better load balancing on the system.

Table C.1. Full-Scale Analysis Assumptions

Assumption Category	Assumption Detail
Size of the Full-Scale network	• 18,000,000 sq. ft. served (5.6x the heated floor area of the Pilot) • 4,000 linear feet of distribution piping (4x the pipe length of the Pilot)
Thermal resources in the Full-Scale network	• Load balancing (including space heating, space cooling, steam system condensate, and domestic hot water) • Wastewater • Cooling towers
Customers participating in the Full-Scale network	• Commercial • Multifamily

Energy Modeling

The Company used energy modeling to quantify the estimated peak load and energy usage of the Full-Scale Rockefeller Center Project. First, the Company generated normalized (kW per sq. ft.) load shapes for space heating, space cooling, and domestic hot water heating for multiple residential and commercial customer types. These customer types were based on representative New York load profiles produced by the National Renewable Energy Laboratory ("NREL") and published in their ResStock and ComStock datasets. Load profiles were then scaled based on the assumed gross floor areas of each customer type in the Full-Scale network.

The Company then constructed a custom hourly UTEN balancing model that simulates balancing of thermal loads among buildings within the network and models dispatch of any additional needed thermal resources required to satisfy net load. Additionally, the Company built custom alternative dispatch models that simulate use of ASHPs, GSHPs, and decarbonized gas and steam to satisfy the same thermal loads.

Using the custom models, the Company computed energy determinants for the four heating and cooling solutions (*i.e.*, UTEN, ASHP, GSHP, and DBAU). These determinants are the key outputs driving costs of the lifecycle cost analyses. The determinants include aggregate electric, gas, and steam consumption, summer and winter electric peaks, and relevant equipment capacities.

Table C.2. Energy Determinants

Category	UTEN	ASHP	GSHP	DBAU
Total Electricity (kWh)	42,513,697	71,819,883	64,268,684	48,060,274
Winter Electric Heating Peak (kW)	15,433	28,611	16,195	-
Summer Electric Cooling Peak (kW)	20,407	29,814	20,787	28,758

Wastewater Capacity (kW-thermal)	45,000	-	-	-
Ground Loop Heat Capacity (kW-thermal)	-	-	103,300	-
UTEN Cooling Tower Capacity (kW-thermal)	63,000	-	-	-
Total Gas (kBTU)	-	-	-	308,074,479
Total Steam (kBTU)	-	-	-	53,288,558

Cost Development

To estimate the Societal and Customer costs of each heating and cooling solution, the Company utilized various assumptions regarding the future of New York State's energy systems. Given the assumption that New York State will achieve CLCPA goals by 2050, the Company projected energy supply and delivery costs accordingly in alignment with the Gas LTP. In the Gas LTP, the Deep Electrification Pathway significantly reduces operation of the gas system, whereas the Hybrid Pathway maintains a larger portion of the gas network using low carbon fuels. Both pathways assume 100 percent clean generation by 2040 and zero carbon steam generation by 2050. The fuel and infrastructure costs assumed for each heating and cooling solution map to the projected costs in these scenarios. All costs were assessed using real (2023) dollars.

Table C.3. Pathways to Achieving CLCPA Goals

Heating and Cooling Solution	Assumption
UTEN	Costs aligned with Gas LTP Deep Electrification Pathway
ASHP	Costs aligned with Gas LTP Deep Electrification Pathway
GSHP	Costs aligned with Gas LTP Deep Electrification Pathway
DBAU	Costs aligned with Gas LTP Hybrid Pathway

The Company leveraged the Gas LTP projections and studies to project the costs of electricity, gas, and steam over the span of the lifecycle cost analysis.

Table C.4. Electricity, Gas, and Steam Costs for UTEN System and Customer Equipment

Cost	Data Source
Societal	
Electricity Supply	NYISO market actuals with growth rates from the Gas LTP.
Electricity Delivery	Aligned with Gas LTP Reference Pathway, with any incremental load being served at the marginal cost of service from the Con Edison 2015 MCOS study
Gas Supply	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Gas Delivery	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Steam Supply	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Steam Delivery	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Customer	
Electricity Supply	NYISO market actuals with growth rates from the Gas LTP
Electricity Delivery	Aligned with Gas LTP Deep Electrification Pathway for UTEN, ASHP, and GSHP analyses; aligned with Gas LTP Hybrid Pathway for DBAU analyses
Gas Supply	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Gas Delivery	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Steam Supply	Aligned with Gas LTP Hybrid Pathway for DBAU analyses
Steam Delivery	Aligned with Gas LTP Hybrid Pathway for DBAU analyses

Customer and Societal Costs

The Company leveraged Pilot project budgets and estimated Full-Scale project costs to model the Customer and Societal costs of UTEN infrastructure and services.

Table C.5. UTEN Costs

Cost	Data Source
Societal	
UTEN CapEx	• Pilot-Scale costs based on Rockefeller Center Project budget • Full-Scale costs based on high-level estimates of how costs will change with economies of scale and learning
UTEN O&M	• Pilot-Scale costs based on Rockefeller Center Project budget • Full-Scale costs based on percentage of CapEx scaled from the Pilot • Full-Scale excludes Pilot-Specific O&M costs (*e.g.*, EM&V)
UTEN Portfolio Administration	• Pilot-Scale costs based on Rockefeller Center Project budget • Full-Scale costs exclude one-time administration costs (e.g., setting up billing during the Pilot) and based on high-level estimate of how costs will change with economies of scale and learning
Customer	
UTEN Costs	• Pilot-Scale costs developed by capping costs at the steam cost from 2026 up to 2035, then switching to Full-Scale rates from 2035 onwards • Full-Scale costs developed by estimating UTEN revenue requirements based on CapEx and O&M from societal models

Customer Equipment and Building Upgrade Costs

The Company then calculated customer equipment and building upgrade costs. The Company assumes that customers make building upgrades for compatibility with each heating and cooling solution. In the Pilot-Scale models, the Company has budgeted to cover the costs of customer equipment and building upgrades during construction of the UTEN.

Table C.6. Customer Equipment and Building Upgrade Costs

Cost	Data Source
UTEN WSHP	• Building HVAC upgrade costs based on average $/sq. ft. costs from sample Con Edison Clean Heat Program projects • No electrical upgrades assumed because of high efficiency of UTEN • WSHP equipment installed cost based from EIA, with a NYC premium

ASHP	• Building HVAC costs based on average $/sq. ft. costs from sample Con Edison Clean Heat Program projects • Additional $/sq. ft. cost for electrical upgrades • ASHP equipment installed cost from EIA, with a NYC premium
GSHP	• Building HVAC costs based on average $/sq. ft. costs from sample Con Edison Clean Heat Program projects • No electrical upgrades assumed because of high efficiency of GSHP • GSHP equipment cost from EIA, with a NYC premium
Boiler and Commercial Chiller	• No HVAC or electrical upgrade cost • Boiler and commercial chiller equipment costs from EIA, with a NYC premium

Equipment Useful Life

The analysis spans the lifetime of Company-owned UTEN piping, which is 80 years. The Company assumes that during this period, customers invest in replacement of equipment that has a shorter useful life.

Table C.7. Equipment Useful Life

Equipment	Useful Life	Data Source
UTEN piping	80 years	Con Edison Joint Proposal gas pipe book life
Cooling tower	15 years	New York State Technical Resource Manual
UTEN WSHP	25 years	New York State Technical Resource Manual
ASHP	15 years	New York State Technical Resource Manual
GSHP	25 years	New York State Technical Resource Manual
Boiler	24 years	New York State Technical Resource Manual
Commercial chiller	20 years	New York State Technical Resource Manual

Emissions Costs

In the Societal models, greenhouse gas emissions are treated as a societal cost, valued at the social cost of carbon. Carbon calculations use 20-year global warming potential values and include emissions associated with fossil fuel production and transportation (lifecycle emissions).

In the Customer models, the Company assumes that a cap and invest program will be in place, and that the penalty for greenhouse gas emissions, valued at the social cost of carbon, will be passed through to emitting customers.

Table C.8. Emissions Costs and Rates

Emissions Data	Data Source
Social cost of carbon (Societal LCAs)	Department of Environmental Conservation three percent discount rate scenario
Carbon cost (Customer LCAs)	Cap and invest program penalty, assumed to be equal to the social cost of carbon from the Department of Environmental Conservation three percent discount rate scenario
Electricity emissions rate	Aligned with Gas LTP. Uses 2021 eGrid,[50] adjusted to incorporate lifecycle emissions accounting.[51] Emissions rate over time decreases in alignment with the CAC Integration Analysis to produce electricity with 70 percent clean energy by 2030 and 100 percent clean energy by 2040
Gas emissions rate	Aligned with Gas LTP. Uses 2022 New York State GHG Inventory, inclusive of lifecycle natural gas emissions.[52] Emissions rate over time is based on the Gas LTP
Steam emissions rate	Aligned with Gas LTP. Uses 2021 New York City GHG Inventory,[53] adjusted to incorporate lifecycle emissions accounting.[54] Emissions decline linearly to achieve carbon neutral steam production by 2040

[50] *See*, https://www.epa.gov/system/files/documents/2023-01/eGRID2021_summary_tables.pdf.
[51] Assumes all electricity emissions come from gas. Uses upstream and downstream emissions factors for gas. Increases eGrid emissions factor at the ratio of upstream plus downstream gas emissions relative to combustion gas emissions. *See*, https://extapps.dec.ny.gov/docs/administration_pdf/ghgappxclcpaemissfctrs22.pdf.
[52] *See*, https://extapps.dec.ny.gov/docs/administration_pdf/ghgappxclcpaemissfctrs22.pdf.
[53] *See*, https://climate.cityofnewyork.us/initiatives/nyc-greenhouse-gas-inventories/.
[54] Assumes all steam emissions come from gas. Uses upstream and downstream emissions factors for gas. Increases NYC GHG inventory emissions factor at the ratio of upstream plus downstream gas emissions relative to combustion gas emissions. *See*, https://extapps.dec.ny.gov/docs/administration_pdf/ghgappxclcpaemissfctrs22.pdf.

Results Calculation

To calculate the final lifecycle cost analysis results for each heating and cooling solution under each cost perspective, the Company multiplied energy determinants by the costs developed. The Company then took the net present value of the 80 years of costs. Distinctive discount rates are used for the Societal and Customer perspective analyses.

Table C.9. Discount Rates

Analysis Perspective	Assumed Discount Rate	Data Source
Societal	3%	New York State Department of Environmental Conservation
Customer	14%	Blend of rates adjusted for inflation for different customer segments from the NYSERDA Potential Study

Results of the Rockefeller Center, presented as charts in Section VII, are presented below.

Table C.10. Pilot-Scale Societal Lifecycle Cost Analysis Results

Cost Category	UTEN	ASHP	GSHP	DBAU
Customer Equipment and Building Upgrade Costs[55]	$71,150,000	$95,730,000	$221,240,000	$6,830,000
UTEN Capital Costs[56]	$45,400,000	$0	$0	$0
UTEN O&M Costs[57]	$18,600,000	$0	$0	$0
UTEN Portfolio Administration Costs[58]	$24,120,000	$0	$0	$0

[55] Customer costs are all costs related to purchase, installation and replacement of customer heating and cooling systems. These include Con Edison payment of initial customer equipment and building upgrade costs. Customers would pay for replacement costs over the 80-year analysis period. The Societal analyses exclude state taxes.
[56] UTEN capital costs include loop construction, the Energy Center, heat exchangers, BTU meters, supplemental cooling equipment, and engineering design and implementation.
[57] UTEN O&M costs include revocable consent for piping, system maintenance, and energy costs for loop operations.
[58] UTEN portfolio administration costs include administrative costs shared among all UTEN projects, including customer operations, billing, UTEN team labor, and central construction support.

Electricity Costs[59]	$47,780,000	$137,770,000	$61,510,000	$0
Gas Costs	$0	$0	$0	$0
Steam Costs	$0	$0	$0	$187,300,000
Social Cost of Carbon	$680,000	$1,090,000	$900,000	$1,630,000
Total	**$207,730,000**	**$234,590,000**	**$283,650,000**	**$195,760,000**

Table C.11. Full-Scale Societal Lifecycle Cost Analysis Results

Cost Category	UTEN	ASHP	GSHP	DBAU
Customer Equipment and Building Upgrade Costs	$326,750,000	$529,830,000	$1,208,160,000	$68,990,000
UTEN Capital Costs	$326,760,000	$0	$0	$0
UTEN O&M Costs	$107,910,000	$0	$0	$0
UTEN Portfolio Administration Costs	$21,290,000	$0	$0	$0
Electricity Costs	$714,190,000	$1,103,730,000	$803,330,000	$626,830,000
Gas Costs	$0	$0	$0	$588,360,000
Steam Costs	$0	$0	$0	$106,750,000
Social Cost of Carbon	$820,000	$1,390,000	$1,250,000	$40,140,000
Total	**$1,497,720,000**	**$1,634,950,000**	**$2,012,740,000**	**$1,431,070,000**

[59] Electricity, Steam, and Gas costs are the supply and delivery system costs associated with the operation of customer equipment.

Table C.12. Pilot-Scale Customer Lifecycle Cost Analysis Results

Cost Category	UTEN	ASHP	GSHP	DBAU
Customer Equipment and Building Upgrade Costs[60]	$550,000	$93,630,000	$240,060,000	$1,380,000
UTEN Costs[61]	$23,350,000	$0	$0	$0
Electricity Costs	$15,110,000	$27,370,000	$19,240,000	$0
Gas Costs	$0	$0	$0	$0
Steam Costs	$0	$0	$0	$40,240,000
Carbon Costs	$490,000	$790,000	$650,000	$1,150,000
Total	**$39,500,000**	**$121,790,000**	**$259,950,000**	**$42,770,000**

Table C.13. Full-Scale Customer Lifecycle Cost Analysis Results

Cost Category	UTEN	ASHP	GSHP	DBAU
Customer Equipment and Building Upgrade Costs	$331,160,000	$523,580,000	$1,729,350,000	$46,330,000
UTEN Costs	$198,750,000	$0	$0	$0
Electricity Costs	$149,740,000	$247,630,000	$197,440,000	$135,450,000
Gas Costs	$0	$0	$0	$122,900,000
Steam Costs	$0	$0	$0	$26,880,000
Carbon Costs	$450,000	$760,000	$680,000	$12,920,000
Total	**$680,100,000**	**$771,970,000**	**$1,927,470,000**	**$344,480,000**

[60] Does not include costs that Rockefeller customers will invest in the project. These will be determined during the Design Phase.

[61] UTEN costs are the estimated costs of the UTEN that a customer will pay on their UTEN bill, assuming that Con Edison provides a subsidized UTEN rate during the Pilot period and for a transition period of the subsequent 5 years.