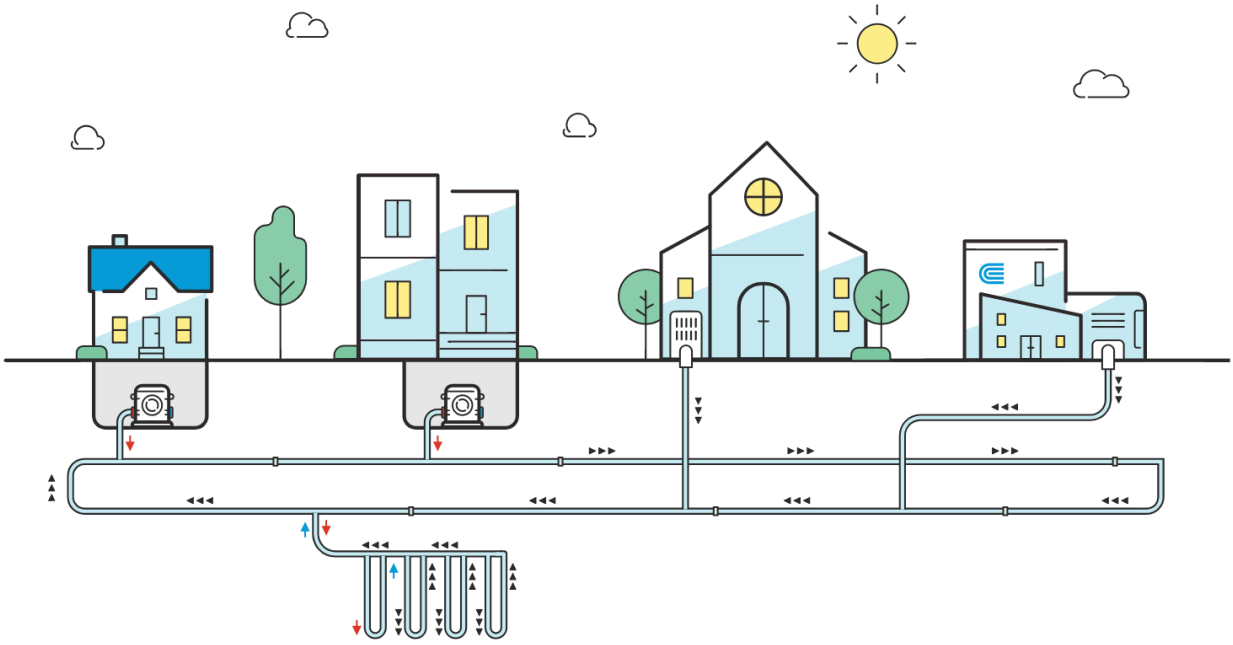
The City of Mount Vernon
Utility Thermal Energy Network (UTEN) Pilot Project

Stage 2 Filing
Final Pilot Engineering Design and Customer Protection Plan

Case 22-M-049

July 9, 2025



List of Acronyms

AC – Air Conditioner
ACCA – Air Conditioning Contractors of America
AGREE – Alliance for a Green Economy
AHJ – Authority Having Jurisdiction
AHU – Air Handling Units
ASCE – American Society of Civil Engineers
ASHP – Air Source Heat Pump
ASHRAE – American Society of Heating, Refrigeration, and Air-Conditioning Engineers
AWWA – American Water Works Association
BAS – Building Automation System
BMS – Building Management System
BTU – British Thermal Unit
CJWG – Climate Justice Working Group's
CLCPA – Climate Leadership and Community Protection Act
COP – Coefficient of Performance
CMV – City of Mount Vernon
CRM – Customer Relationship Management
CSR – Customer Service Representatives
DHW – Domestic Hot Water
DOE – Department of Energy
DPS – Department of Public Service
DPS Staff – Department of Public Service Staff
DX – Direct Expansion
EC – Energy Center
ECB – Energy Center Building
ECB – Energy Control Box
EH&S – Environmental Health & Safety
EM&V – Evaluation, Measurement, and Verification
ETC – Emerging Technology Committee
ETS – Energy Transfer Station
FAT – Factory Acceptance Testing
FEMA – Federal Emergency Management Agency
FTE – Ful Time Employee
GLD – Ground Loop Design
HDPE – High-Density Polyethylene
HMI – Human Machine Interface
HVAC – Heating, Ventilation, and Air Conditioning
I&C – Instrumentation and Controls
ITC – Investment Tax Credit
KWL – Kerr Wood Leidal
LDCs – Load Duration Curves
LMI – Low-to-Moderate Income
MAC – Monthly Adjustment Clause
MPT – Maintenance and Protection of Traffic
NYS – New York State
NYLCV – New York League of Conservation Voters
NYSBCTC – New York State Building and Construction Trades Council
PASNY – Power Authority of the State of New York

PLA – Project Labor Agreement
PLA – Project Labor Agreement
PSC – Public Service Commission
RCM – RCM Energy Services
RTU – Remote Terminal Unit
SBA – Small Business Administration
SCADA – Supervisory Control and Data Acquisition
SEED – Supplier Enablement, Engagement and Development
TCT – Thermal Conductivity Tests
TCTs – Thermal Conductivity Tests
The City – The City of Mount Vernon
TMYx – Typical Meteorological Year x
TXV – Thermostatic Expansion Valve
UDS – Utility Data System
UDS – Utility Distribution System
USGS – United States Geological Survey
UTEN – Utility Thermal Energy Network
UTENJA – Thermal Energy Network and Jobs Act
VRF – Variable Refrigerant Flow

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1. INTRODUCTION

The Utility Thermal Energy Network and Jobs Act has set the stage for a new model of providing customers with clean heating, cooling, and domestic hot water (DHW).[1] In response to this legislation, the Public Service Commission (PSC) directed New York's seven largest utilities to propose at least one utility-owned thermal energy network (UTEN) Pilot project.[2] In November 2023, Con Edison embraced the opportunity and proposed a trio of UTEN Pilots: at Rockefeller Center, Mount Vernon, and Chelsea, Manhattan. The Mount Vernon Pilot, which is the subject of this filing, is designed to explore the feasibility using thermal energy from geothermal boreholes to provide heating and cooling to residents. This scalable suburban UTEN will serve a dynamic mix of buildings in an area identified as having leak-prone natural gas piping and is in a disadvantaged community.

In April 2024, the Department of Public Service Staff (DPS Staff) confirmed that the Mount Vernon UTEN Pilot met the necessary criteria to advance to Stage 2.[3] Since then, the Company has developed a Final UTEN Pilot Engineering Design and Customer Protection Plan (Stage 2 Filing), which includes a 100% complete engineering design, customer protections, operational requirements, cost recovery, and performance metrics. While the required investment would be meaningful, this Pilot's design and implementation strategy would provide NYS valuable learnings informing its development of statewide thermal energy network policy and yield meaningful benefits to Pilot participants in a disadvantaged community. The Company requests the Commission approve this Plan and authorize the Mount Vernon Pilot to proceed to Stage 3 to begin customer enrollment and Pilot construction. This next phase is an important step to realizing the full potential of the Mount Vernon Pilot and providing direction for future thermal energy networks across the state.

[1] Laws of 2022, Chapter 375 (enacted July 5, 2022).
[2] 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).
[3] *UTEN Proceeding,* UTEN Stage 1 Compliance Letter Chelsea (April 9, 2024) (*Chelsea Compliance Letter)*.

2. PILOT OVERVIEW

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) climate goals. The Mount Vernon Pilot is one of three UTEN pilots that Con Edison is proposing.

While surface temperatures fluctuate with the seasons, the ground temperature stabilizes at approximately 55°F just a few hundred feet below the surface. This consistent thermal energy acts as a natural battery and serves as a reliable, renewable resource for heating and cooling buildings through the use of heat pumps—eliminating the need for fossil fuels. The Mount Vernon Pilot will connect 42 existing buildings and one new mixed-use Energy Center through a system of underground pipes filled with a water-based fluid. This system, called a Utility Distribution System (UDS), will use the earth's steady temperature – through four geothermal bore fields – to help heat and cool the connected buildings.

The UDS will consist of two pipes: one for supplying thermal energy and one for returning thermal energy. To connect the 42 existing buildings to the system, the Company will upgrade the heating and cooling equipment to ground-source heat pumps at no cost to the customers. Residential buildings and one multifamily complex will also undergo free energy efficiency upgrades to provide better insulation to reduce the energy required to heat and cool the buildings.

Additionally, as shown in Figure 1, a portion of the Mount Vernon Pilot area contains a section of cast iron gas main—eight inches in diameter and originally installed in 1890—that is considered leak-prone. This section is located on S 9th Avenue between W 2nd Street and W 3rd Street. This 500-foot section of leak-prone pipe supplies gas to eight 1-4 family home buildings and a Church. These buildings will be fully electrified—including heating, cooling, hot water, and appliances like stoves and dryers. This will allow the gas pipe to be safely shut down, avoiding the need for costly repairs.

Figure 1: Leak Prone Pipe Section of Mount Vernon Pilot

The City of Mount Vernon (CMV) is a key stakeholder in this Pilot, serving as the Authority Having Jurisdiction (AHJ) and owning both planned bore field sites and two buildings within the project area—the Fire Station and the Doles Recreation Center. From the beginning, the project team recognized the importance of close collaboration with the City. In addition to regular coordination—through weekly meetings, City Council presentations, and community events—the Company is also working with the City to develop a new mixed-use Energy Center building. This facility will not only support the thermal energy network but will also serve as a hub for the City's Emergency Services. This partnership with the CMV yielded positive results, with the City granting approval for construction activities essential to finalizing the engineering design. Additionally, Con Edison's legal team and the City's legal team have agreed in principle to non-binding terms regarding land use agreements needed for the placement of bore fields and the siting of the Energy Center building.

Participants in this Pilot include a mix of 1-4 family homeowners, places of worship, a medical center, large affordable multifamily buildings and municipal buildings. The new mixed-use Energy Center building, to be constructed during Stage 3, will also be a UTEN participant. Together, these buildings comprise approximately of 432,170 square feet of conditioned space

and contain a total of 252 residential units. A detailed breakdown of participants can be found in Table 1.

Table 1: Mount Vernon Pilot Participants

Building	Number of Buildings	Total Square Footage	Existing HVAC System	Description/Notes
1-4 Residential	26	71,091 Total	Various (ASHP, Gas, Fuel Oil)	Individual and multi-unit homes
L.I.V.E. Church	1	5,200	Fuel-oil furnaces, window AC	Two floors; currently undergoing HVAC upgrades
Church of Sts John, Paul, & Clement	1	5,792	Gas boiler, no cooling	Heated by radiators; no existing cooling system
Macedonia Baptist Church	1	38,572	Gas-fired DX units, radiators	Two sanctuaries with different systems; includes domestic hot water heater
Medical Center	1	50,203	Gas rooftop units	Two-story outpatient facility with central atrium
Recreation Center (Doles)	1	38,387	Steam boiler, gas rooftop units	Includes theater, classrooms, and community spaces
Fire Station	1	20,362	Multizone unit, rooftop units	Includes dormitory, gym, and emergency services office
Multifamily Complex A (Ebony Gardens)	6	136,368	Gas boilers, window AC	Apartments with baseboard heating and window AC units
Multifamily Complex B (Greater Centennial Homes)	4	56,519	Gas boilers, window AC	Multifamily buildings with hydronic baseboard heating
Energy Center Building	1 (planned)	8,676	N/A (new construction)	Will house UTEN infrastructure and office space for CMV

Construction and commissioning are forecasted to take 24 months and is estimated to cost $119.39 million to complete the Pilot, excluding contingency. The Company proposes to recover the costs from electric ratepayers. Thermal networks in an electrified future will

meaningfully reduce peak electric system demand, thereby reducing the amount of electric system expansion required to meet the State's decarbonization goals. Recovery from electric customers thus properly aligns UTEN costs with the energy commodity receiving these benefits.

Given the Pilot's innovative construction, operation, and business challenges, the Company is committed to implementing several strategic measures to manage additional and unforeseen Stage 3 Costs. Further details are provided in the Cost Recovery and Accounting Treatment section below.

2.3. Disadvantaged Communities

The Utility Thermal Energy Network and Jobs Act requires that at least one proposed pilot project from each applicable utility be in a Disadvantaged Community within the utility's service territory, in alignment with Climate Leadership and Community Protection Act (CLCPA) goals. The Mount Vernon Pilot will provide benefits to the residents of Mount Vernon, many of whom are Low-to-Moderate-Income (LMI) and located in a Disadvantaged Community.

The Climate Justice Working Group's (CJWG) Disadvantaged Communities Criteria uses 45 different indicators, including environmental burdens and climate change risk as well as population characteristics and health vulnerabilities.[4] The Pilot's census tract area has a Burden Score Percentile of 40%, which represents the combined percentile ranking for the cumulative score of all indicators within the 'Environmental Burden and Climate Change Risk' category that takes into account potential climate change risks and pollution exposures. Additionally, Mount Vernon has 93% of residents considered low- to- moderate-income or earning less than 80% of Area Median Income. This share of low- to- moderate-income households is higher than 49% of census tracts in New York State. As of July 3, 2025, 38% of residents in the Pilot area is enrolled in Con Edison's Energy Affordability Program. The Vulnerability Score Percentile is 90%, which includes high asthma rates and more than half 59% of the population is identified as disabled based on NYSERDA's Data Dictionary.[5] The UTEN will provide added benefits to the community, as all upgraded equipment will include air filtration and operate with cleaner energy sources, helping to improve indoor air quality and reduce environmental health risks.

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[4] New York State Climate Justice Working Group, *Technical Documentation on the Disadvantaged Communities Criteria – Final Version*, https://climate.ny.gov/-/media/Project/Climate/Files/Disadvantaged-Communities-Criteria/Technical-Documentation-on-the-Disadvantaged-Communities-Criteria---Final-Version.pdf (Mar. 27, 2023).

[5] New York State Energy Research and Development Authority, *Clean Energy Dashboard Glossary*, at [term or section] (accessed July 1, 2025), https://www.nyserda.ny.gov/About/Tracking-Progress/Clean-Energy-Dashboard/Glossary (NYSERDA Data Dictionary).

In addition, Ebony Gardens, a 144-unit affordable housing community in Mount Vernon will be connected to the UTEN, as will the buildings' residents. As such, the Pilot will be directly serving low-income customers and the Disadvantaged Community in which the Pilot is located. A cluster of four multi-family buildings, Greater Centennial Homes, located at the corner of W 4 Street and S 9 Ave is another 45-unit affordable housing multifamily complex that will be connected to the UTEN. The Doles Recreation Center, the Fire Station, and a nonprofit medical center are also connected to the UTEN, and each plays a vital role in delivering essential services to the Mount Vernon community.

The Pilot includes robust customer protections to provide fair and predictable energy costs through the duration of the Pilot. These protections will be essential to securing the participation of residents and building owners, whose involvement is critical to the success of the pilot. Comprehensive customer agreements outline the terms clearly, offering transparency and peace of mind. Rates are carefully structured to keep customers at or below their current energy bills, preventing unexpected financial strain. For residential customers, a bill protection mechanism limits their energy costs based on the lowest amount of their past three years of bills, safeguarding against unpredictable spikes in cost. Large customers will benefit from dedicated heating and cooling cost protection, guaranteeing their heating and cooling expenses remain consistent with what they would have been if they had remained on their conventional equipment. This protection is designed to be easy to understand, offering clear, reliable assurances that participation in the Pilot will not result in higher costs. Together, these protections create a stable, customer-friendly framework that supports affordability and confidence in the Pilot.

2.4. General Learnings from Stage 2

The Mount Vernon Pilot has and will continue to yield a range of detailed learnings across technical, operational, workforce, financial, and regulatory domains, offering a robust framework for future UTEN deployments in urban environments.

Technical and Design Learnings: The Mount Vernon UTEN Pilot's engineering design phase revealed key lessons for future thermal network planning. A two-pipe, single-loop system was adopted to ensure consistent delivery of thermal energy all along the network. Integrating air-source heat pumps into the network reduced bore field needs and added resilience. A 25% propylene glycol solution was selected for safe, efficient heat transfer. Real-time data needs led to full SCADA integration with hourly metering. Customer retrofit costs were higher than expected, emphasizing the value of early site assessments. The Energy Center evolved into a purpose-built

facility to support infrastructure and community needs, while detailed thermal modeling enabled cost-effective, long-term system balance.

Monitoring and Controls Strategy: The SCADA system strategy evolved toward a cloud-based solution due to regulatory constraints and cost considerations. However, cybersecurity concerns necessitated disabling remote control functions, requiring local control panels for manual operations. Delays in finalizing this strategy impacted project timelines, emphasizing the need for early involvement of IT subject matter experts.

Workforce Development: An Emerging Technology Committee (ETC) will be established early in the process to enable cross-functional alignment and proactive training. A formal skills gap analysis will inform the development of multi-modal, role-specific training programs. Specialized equipment, such as pre-insulated piping, will require targeted training that is not yet common in the local contractor market.

Financial and Cost Estimate Insights: The Mount Vernon UTEN Pilot revealed several key financial and cost insights critical for future thermal energy network planning. The Pilot's total cost rose from $83M to $192M, including contingency, due to the inclusion of DHW loads, the construction of a new purpose-built Energy Center, and the completed design work enabling more accurate cost estimates, particularly for customer retrofit estimates. Early assumptions underestimated the complexity of retrofitting diverse building types. Detailed site assessment conducted in Stage 2 revealed the need for a wide range of complex upgrades for Heating, Ventilation, and Air Conditioning (HVAC), electrical, and plumbing systems. The need for real-time performance tracking led to the integration of a full SCADA system, adding $5.14M in unanticipated costs. Transitioning from a one-pipe to a two-pipe system improved performance and consistency of service but increased infrastructure requirements. Inflation and labor market and tariff volatility further drove up costs, while the loss of a major bore field site required the addition of two new fields, increasing construction complexity.

Rate Design: During early customer recruitment in The City of Mount Vernon it became evident that the community could not absorb an increased energy burden. As a result, participation in the Pilot would have been unfeasible if a cost-based thermal rate had been applied. This demonstrated that affordability was a critical driver of participation – especially in disadvantaged communities. Subsidized rates proved essential to enable participation, including during Stage 2 of the Pilot. A key challenge identified through building site assessments and energy modeling was that many1-4 family homes were chronically under-heated in winter and under-cooled in

summer. Achieving thermal comfort – even with energy efficiency upgrades and efficient UTEN equipment – would increase energy use and costs.

Bill analysis found that highly subsidized thermal rates were necessary for most participants to realize savings, with additional protection for those facing higher bills. While this approach improved accessibility, it also highlighted the need for future rate structures to gradually transition toward cost-reflective pricing.

3. PILOT OBJECTIVES

The Mount Vernon Pilot will deploy novel technical and business approaches to deliver immediate and long-term benefits and learnings to customers and the State. The Company expects that the findings from the Mount Vernon Pilot will create a blueprint that can inform future decarbonization work across the service territory and beyond. The Company anticipates achieving the following learning objectives:

- **Retrofitting solutions on various building stock:** Implementing geothermal energy in medium-density and disadvantaged neighborhoods with diverse building types will present unique challenges. Because no single retrofit approach fits all building conditions, the Pilot will generate valuable insights into adapting geothermal solutions across a range of existing structures.
- **Installing geothermal boreholes:** The project will install deep geothermal boreholes on private properties, requiring land use agreements with owners. These boreholes will connect to the thermal network and involve drilling, construction access, and long-term site integration, with restoration provided post-installation.
- **Building community trust and participation:** Marketing and communication strategies will be explored to engage a broad range of customers in a UTEN. Special attention will be given to community engagement approaches that build stakeholder support in Disadvantaged Communities, where residents may be less likely to adopt new utility offerings.
- **Partnering with a local municipality:** A collaborative relationship with a local municipality will be navigated to jointly plan, construct, and promote a UTEN, offering one of the first examples of this type of partnership.
- **Evaluating the effectiveness of non-pipe solutions:** Full electrification of nine buildings currently served by a section of leak-prone gas pipe will be targeted. This effort will provide a unique opportunity to assess non-pipe alternatives within a broader thermal energy network.
- **Implementing a two-pipe geothermal system:** The Pilot will explore the implementation of a two-pipe geothermal system and assess whether similar configurations have been deployed elsewhere in the U.S., contributing to a broader understanding of system design best practices. Additionally, the Mount Vernon Pilot will explore the potential for scalability specific to an interconnected loop design.

- **Air Source Heat Pumps (ASHP) in Shoulder Seasons:** The use of air source heat pumps during shoulder seasons will be demonstrated as a strategy to reduce upfront bore field sizing and costs, while maintaining system performance.

3.1. Pilot Benefits

In addition to contributing to the above learning objectives, the Mount Vernon Pilot will provide other key benefits:

1. Decarbonization: Reduce emissions and achieve environmental goals, including those in the CLCPA.

The Pilot will retire old gas infrastructure and transition the community to a cleaner energy source – geothermal. The Company expects that this project will:

- Reduce an estimated 40,000 lifetime[6] metric tons of CO2, based on energy modeling of 40 buildings for which all energy data (electric, gas, oil) were available;
- reduce impact to electric system by estimated 45% when compared to converting buildings to air-source heat pumps;
- Retire 500 feet of leak-prone gas pipe;
- Reduce overall building energy consumption and improve customer comfort by pursuing cost-effective energy efficiency upgrades such as weatherization measures; and
- Evaluate savings realized by pairing UTENs with energy efficiency measures such as building air sealing and insulation.

2. A Just Transition for the Workforce: Create new job opportunities and an equitable pathway for all members of the workforce.

- It is crucial that the shift from fossil fuels to thermal energy is fair and equitable for all workers. The Company will:
  - Complete all skilled trade work for both customer and Company owned infrastructure with a union workforce;
  - Enter a Labor Peace Agreement with the Company's internal workforce; and
  - Pursue a Project Labor Agreement (PLA) for the construction of the thermal energy network.

3. Improving Quality of Life: provide free heating and cooling HVAC equipment at no cost for participating customers.

[6] Lifetime of the UTEN is defined as 25 years to be consistent with DPS Lifecycle Cost Analysis guidance.

- The Pilot will provide more efficient and comfortable heating and cooling options to customers at no cost. Some customers currently lack air conditioning, even during extreme heat. The Company will:
    - Install high-efficiency, all-electric HVAC systems in participating homes and buildings at no cost to customers;
    - Conduct outreach and enrollment to ensure eligible customers are aware of and can access the free equipment offering; and
    - Coordinate with contractors to ensure timely and quality installation of HVAC systems.

4. **Equal or lower energy costs:** The Pilot's bill protections will ensure customers do not pay more for heating, cooling, and DHW on the UTEN compared to current practices. This Pilot will:
    - Implement bill protection mechanisms to cap small customer costs at or below current levels, and larger customer costs at or below what they would have been if they had remained on conventional equipment;
    - Monitor and compare pre- and post-conversion energy usage and costs to validate savings; and
    - Provide clear, accessible billing information and customer support to explain changes and protections.
5. **Supporting community centers**: The Mount Vernon Pilot aims to serve important community institutions.
    - These institutions include the local fire station, churches, Doles Recreation Center, and the Mount Vernon Neighborhood Health Center.
    - Additionally, instead of a direct payment by the Company for the use of land designated for bore fields, a collaborative agreement was established with the CMV. Under this arrangement, the newly constructed Energy Center building includes an additional floor, providing dedicated space for the City's Emergency Department personnel—supporting both the City's operational needs and the Pilot's development goals.
6. **Opportunities for community education on the future of clean energy**: The Pilot will enable the local community to actively learn and participate in achieving clean energy goals. The Energy Center will serve as an educational hub for residents to learn about clean energy.

4. SITE SELECTION AND SCOPE

The Mount Vernon Pilot originated from a study the Company performed as part of its Gas Rate Plan District Energy Initiative, which identified sections of leak-prone pipe in the Company's service territory.[7] The original project scope was limited to the one block surrounding a section of leak-prone pipe, but the Company expanded the project area to create a Pilot with a variety of building typologies to allow the Pilot to provide a wider array of lessons that can be used in future projects. The Company retained the engineering consultants that were used on the original project, CDM Smith, and their subcontractor, ZBF Geothermal, to expand upon the original scope for the Pilot.

In the Company's Stage 1 filing from 2023, the Company proposed a scope of up to 76 buildings in the area. However, as the design process progressed into Stage 2, the Company refined the scope to focus on 42 existing buildings and one new mixed-use Energy Center building. This optimization was driven by a combination of technical, economic, and customer engagement considerations outlined below:

- In Stage 1, multifamily buildings such as Levister Towers and Grace House were excluded due to their high retrofit costs and large, non-diverse heating loads. In Stage 2, the same strategy was used to further descope the project to ensure a more balanced and cost-effective network. This decision significantly reduced the number of boreholes and overall project costs.
- In Stage 2, the design retained the original Pilot footprint but introduced a revised pipe routing strategy that served all customers within the Pilot footprint. The modeling of building loads across the area led to the requirement for six bore fields and Air Source Heat Pump (ASHP) auxiliary heating and cooling. Due to the increased thermal energy resource requirement, the pipe routing was adjusted to include most of the customers who completed energy assessments. This approach allowed for a more strategic and logical selection of UTEN participants and further reduced the number of bore fields needed. The final design serves 43 buildings and requires 127 boreholes across 4 bore fields.
- To increase the likelihood of successful implementation, the final building selection prioritized those with residents who had responded to UTEN outreach efforts – such as marketing calls, emails, mailers. See Table 2 for further details.

[7] Case 19-G-0066*, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service* (Gas Rate Plan Proceeding), District Energy Report (filed August 22, 2022) (District Energy Report).

Table 2: Summary of Pilot Site Selection and Design Development

Stage	Sq. Ft.	Building Scope	Number of Bore fields/Boreholes	Estimated Cost	Cost Basis
Stage 1	379,172	Includes 76 participating buildings, inclusive of an Energy Cetner Building. Excludes 8th Ave residential buildings, Levister Towers, Grace House, Multifamily Greater Centennial Homes	3 bore fields (130 boreholes)	$77M	ASHRAE standard load calculations, general building stock available through Google Earth. DHW loads selectively included
Stage 2	623,564	**Full build-out:** Includes 113 buildings, inclusive of an Energy Center Building. Excludes Grace House, Levister Towers.	6 bore fields (220 boreholes) and ASHP auxiliary heating and cooling	$266M	42 site visits, metered data, extrapolated loads to remainder of 112 buildings
Stage 2	432,170	**Pilot build-out:** Includes 43 buildings, inclusive of an Energy Center Building. Excludes 8th Ave residential buildings, Levister Towers, and Grace House.	4 bore fields (127 boreholes) with ASHP as backup/emergency heating and cooling	$192M	42 site visits, metered data for each large customer and sampling of 1-4 family homes, detailed engineering. Note: Addition of DHW to all buildings; and largest bore field space was lost due to CMV construction plans at Doles Center green space.

5. FINAL PILOT ENGINEERING DESIGN

At the time of this filing, the Mount Vernon UTEN Project has completed 100% of its engineering design, including all associated drawing packages and technical deliverables. All design packages are finalized and ready to support the procurement process and preparation of bid packages upon approval to proceed to Stage 3.

5.1. Background

The Mount Vernon UTEN Project is a 2-pipe ambient loop system designed to deliver efficient, low-carbon heating, cooling, and DHW to a mix of up to 43 buildings, including 1-4 family residential homes, multifamily apartment complexes, places of worship, medical building, fire department, community recreational building, and a new mixed-use Energy Center building which will contain office space utilized by the CMV employees. It sources its thermal energy from four bore fields consisting of 127, 850-foot-deep boreholes. To make this system viable, the project will install over 11,000 linear feet of underground piping as the UDS to deliver 8,987 MBH of peak heating and 7,546 MBH of peak cooling to the participating CMV customers.

The UTEN system functions by capturing geothermal energy from boreholes and will transfer and transport it via the UDS to the Customer Equipment, which will provide heating, cooling, and where feasible, DHW to UTEN customers. The Energy Center will consist of equipment and infrastructure necessary to operate the UDS. A local controller will autonomously operate the system, while a SCADA system will remotely monitor and analyze the overall performance of the UTEN. Control valves at the Energy Center, Energy Transfer Stations (ETS), and customer interfaces—integrated with Con Edison's SCADA system—regulate flow and temperature to maintain optimal performance, ensure redundancy, and protect equipment from thermal extremes.

Thermal energy from each bore field will be transferred into the Utility Distribution System via a Thermal Energy Resource ETS. The air-source heat pumps, located on the roof of the Energy Center building, will be utilized during the shoulder seasons to recharge the bore fields during low load and temperate weather, and may be utilized as emergency backup on the coldest/hottest days. The Utility Distribution System supply loop will transport the thermal energy between the Thermal Energy Resource ETS and the Customer ETS heat exchangers via the equipment located in the new Company-owned Energy Center building.

The Thermal Energy Resources, Utility Distribution System, Energy Center, Customer equipment, and SCADA System will be designed to support future building connections and

enable UTEN expansion into adjacent neighborhoods. See Figure 2 for an illustration of the Pilot footprint.

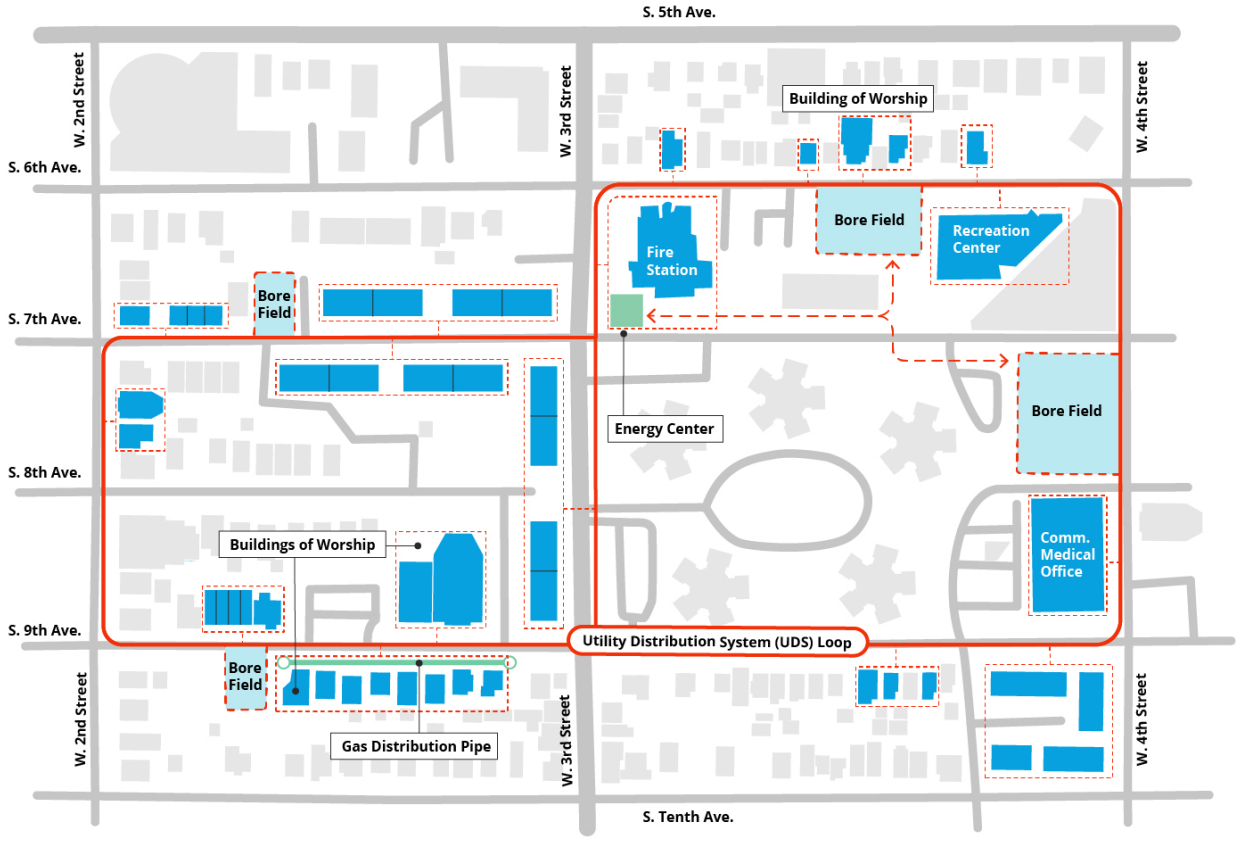

Figure 2: Mount Vernon Pilot Footprint

5.2. Design Considerations

The Company and its consultants made several initial design decisions based on key priorities such as environmental, health, and safety, reliability, cost control, and future scalability. These priorities are as follows:

Environmental, Health, and Safety

- Leveraging Company standards and procedures related to construction, infrastructure maintenance, and leak management.
- Complying with applicable codes and standards for the three new electric services (Energy Center Building and two bore field ETSs), and 40 electric service upgrades.
- Complying with applicable codes and standards for 34 electric panel upgrades.
- Complying with existing codes and standards for installing temporary boilers and equipment required to ensure UTEN reliability during emergency and backup scenarios.

- Designing equipment and infrastructure with appropriate heights, clearances, and shut offs for safe maintenance.
- Incorporating sensors and equipment statuses into SCADA to allow the Company to remotely monitor the operation of the UTEN to allow for early detection of potential leaks, faults or safety risks via alarms.
- Developing an Emergency Plan to safely isolate all or parts of the UTEN in the event of an emergency.

Reliability

- Incorporating sensors (flow, differential pressure, temperature, etc.) and equipment statuses into SCADA to allow the Company to remotely monitor and maintain system performance
- Providing an "n+1 redundancy" for the UDS distribution pumps and bore field ETS pumps so there is uninterrupted service in the event of pump failure or preventative maintenance.[8]
- Providing emergency backup heating/cooling of the Utility Distribution System by installing two air-source heat pumps on the roof of the Energy Center as a connection point to the UDS to maintain heating/cooling if the UDS temperature setpoints are exceeded. There is enough space on the roof for a third ASHP to be installed, if needed.
- Providing opportune heating/cooling of the bore fields during the shoulder seasons by installing two air-source heat pumps (and adequate space for a third heat pump, if needed) on the roof of the Energy Center building to recharge the bore fields during low load and temperate weather conditions.
- Providing backup cooling by installing a connection point to install a roll-up rental chiller or portable cooler to maintain safe UDS temperatures if heat cannot be rejected into the bore fields when the UDS temperature setpoint is exceeded.
- Providing backup boilers by installing a connection point to install a roll-up rental boiler (12,320 MBH capacity) to maintain safe UDS temperatures if heat cannot be rejected to the bore fields when the UDS temperature setpoint is exceeded. This backup boiler can be retrofitted to a natural gas boiler.
- Providing a diesel backup generator at the Energy Center building, in the event of an electrical outage at the building level.

[8] N+1 redundancy refers to a system design principle in which one additional component is added to a group of N required components to ensure continued operation in the event of a single component failure. This configuration enhances system reliability and availability, particularly in critical infrastructure and high-dependability environments.

- Utilizing a 20-year prediction model for bore field modeling allows for multidecade resiliency with a cost-conscious approach that allows bore field temperature monitoring and annual thermal balance opportunities.
- Designing the UDS with multiple feeds and valves to be able to isolate sections of the main while operating the remainder of the UDS.
- Redesigning the UTEN from 2 separate UDSs to one larger UTEN to simplify the operation of the Pilot and avoid potential operating errors of a tightly configured energy center mechanical room. Two heat exchangers were eliminated, and thermal balance monitoring and control became much simpler.
- Designing the UTEN to meet high groundwater table standards.

Cost Control

- Deprioritizing exceptionally large customer loads in favor of a broader mix of smaller customers or those with annual load diversity to manage thermal demand and reduce infrastructure requirements.
- Routing the UDS pipe strategically to maximize connectivity for candidates who completed the free energy assessment.
- Excluding buildings on S 8th Ave, Levister Towers, Grace House, those that did not complete the free energy assessment, and homes with suspected asbestos, mold, or code violations, thereby reducing the Pilot cost from $266M to $192M.
- Drilling one test borehole during Stage 2 at a cost of $186,000, and planning to conduct thermal conductivity tests (TCTs) on the remaining three bore fields during Stage 3 construction to stay within budget and secure a more cost-effective package.

Future Scalability

- Installing a larger UDS pipe size than what is needed to satisfy current demand of the 42 existing buildings and the new Energy Center building (14” pipe instead of 12” pipe on W 3rd Street; 12” pipe instead of 10” pipe elsewhere).
- Having a greater UTEN UDS pipe capacity to accommodate an additional 500 tons of heating and cooling capacity than what is needed to satisfy current demand of the Mt. Vernon customers.
- Installing isolation valves and tees at every intersection for future connections throughout the project area, so that UTEN expansion may occur in any direction with minimal disruption to existing UTEN customers.

- Having discussions with the CMV about the interest of the nearest cluster of City owned buildings to join the UTEN, north-east of the UTEN project area.
- Evaluating system performance thermal balance on an annual basis to determine if customers within the project footprint can join the UTEN while the Pilot is in operation.
- Working closely with the design team of the new community building that will be installed adjacent to the Doles Recreation Center, for potential connection to the UTEN (within Pilot period). As the owner of the building, the CMV has signed a Letter of Interest in joining the UTEN once the building is constructed.

The following stakeholder concerns also guided the Pilot design:

- An additional floor was incorporated into the Energy Center building design to accommodate use by the CMV's Emergency Management department. This modification required further structural analysis and increased design and construction costs. However, the costs were offset by eliminating the need for four bore field easements. The inclusion of the second floor also facilitated the development of a land use term sheet agreement with the City for bore field access.
- The largest bore field was removed from the design to accommodate Mount Vernon's plans to build a Youth Center building with a basement. This required finding two replacement fields to accommodate the number of removed boreholes. As a result of this reconfiguration, the UTEN operation was modified to incorporate air-source heat pump operation during the shoulder seasons to maintain annual thermal balance.
- The CMV issued a directive that prohibited the placement of UTEN mains on top of their existing infrastructure (sewer and water mains). The UDS pipe routing plan was updated to accommodate the request.
- Between the 60% and 90% design of the Pilot, Greater Centennial Homes were redesigned from a Variable Refrigerant Flow (VRF) system to ground source console units in response to the property owners' direct feedback. The property owners preferred the console units over a VRF system for their improved exterior aesthetics.
- Greater Centennial Homes requested a bore field to be located on their property. The engineering design team evaluated this request and determined that 14 boreholes, each 850 feet deep, could be accommodated within the available footprint. This configuration would have been able to support one of the four building, based on the analysis of 3 years of metered data (2022-2024). However, after evaluating the bore field capacity against the customer load requirements and construction costs, the site was not deemed a viable bore field for the Pilot.

- At the beginning of Stage 2, only two Greater Centennial buildings (facing S 9 Ave) were considered UTEN eligible and targeted for outreach. Subsequently, the design was revised to include all four buildings on the shared lot at the request of management and ownership, who expressed conditional interest in the Pilot contingent upon all 4 buildings being connected to the UTEN.
- The preliminary customer load analysis from Stage 1 indicated that Grace House's heating-dominant load was too large for the Pilot. Greater Centennial ownership (which also owns Grace House) requested a reconsideration for Grace House to connect to the UTEN. The design team conducted a free energy assessment, evaluated metered data, and modeled the load. This reconfirmed the exclusion of Grace House, but satisfied building ownership.
- In response to feedback from Levister Towers residents during Town Hall and outreach events, the UTEN expansion strategy has been revised to follow a phased implementation. Subject to bore field capacity and construction budget limitations, additional buildings may be integrated into the UTEN in future phases to meet evolving customer demand.

5.3. Design Approach

5.3.1. Engineering Team and Strategy

The Mount Vernon UTEN Pilot was designed by CDM Smith NY Inc., an engineering firm that has led the design of six recent thermal energy networks in the United States. CDM Smith prioritized constructability, scheduling efficiency, and maximized learning opportunities to optimize the clean energy transition journey. They partnered with ZBF Geothermal, a firm experienced in geothermal projects in New York State, who delivered the residential design and tackled the test borehole driller selection process and work plan. CDM Smith and ZBF Geothermal tackled regulatory framework challenges and produced a New York State code and Westchester Municipality code compliant UTEN design.

CDM Smith served as the lead design firm for UDS pipe routing and system architecture, Energy Center building design, bore field selection, thermal capacity modeling, energy modeling, instrumentation and controls (I&C), large non-residential building customer conversion strategies inclusive of mechanical, electrical, plumbing and fire protection design. ZBF Geothermal leaned on their technical expertise in HVAC design to deliver the residential geothermal conversion strategies for each of the twenty-six residential (1-4 family) buildings, taking into account the existing building conditions, prioritizing least intrusive *and* most cost-effective conversion methods. CDM Smith structured its team around a dedicated Project Manager supported by a team of subject matter experts in energy modeling, cost estimating, geothermal and geotechnical

design, architectural, electrical, mechanical, plumbing, and civil design. To expedite field work, such as developing floor plans of mechanical spaces and individual apartment units, CDM Smith dedicated the services of an expediter to ensure the timely completion of the engineering design.

CDM Smith submitted five drawing packages and various other design deliverables at five stage gates throughout the design process: preliminary, 30%, 60%, 90% and 100%. During each stage gate, at least 10 distinct deliverables were submitted for Con Edison's review, including a Basis of Design document, construction specifications, and operating procedures. It is important to note that no permits were obtained during Stage 2 since they would have expired before construction could start in Stage 3. One drawing package was delivered containing:

- Utility Distribution System and Maintenance and Protection of Traffic (MPT) Plans
- Bore Field and Energy Transfer Station (ETS) Design
- Energy Center Building
- Doles Recreation Center
- Medical Center
- W 3 Street Fire Station
- Ebony Gardens
- Greater Centennial Homes
- Religious Buildings
- Residential (1-4 Family) Buildings Design

The drawing package included drawings from the following trades, as applicable:

- Mechanical
- Electrical
- Plumbing
- Structural
- Architectural (Energy Center building only)
- Fire Alarm

Drawing packages and other related deliverables can be found in the Appendix.

Throughout the stage gates, drawings and other relevant deliverables were reviewed by Subject Matter Experts within Con Edison, as well as two engineering peer reviewers. The Company hired two industry experts, Kerr Wood Leidal and RCM Energy Services, to verify that all drawings comply with all industry standards and city, state, and federal laws:

Kerr Wood Leidal (KWL) is a well-respected Canadian consulting engineering firm with a long history, established in 1975. They are recognized leaders in the analysis, design,

and construction of district energy systems, offering expertise in both high-temperature and low-temperature networks, as well as community renewable energy resource mapping. Their team possesses a strong blend of strategic planning and technical analysis, taking a technology-neutral approach to develop effective solutions. Having KWL as a peer reviewer for the Thermal Energy Network design stage was crucial due to their extensive and specialized experience in this field, ensuring the design was robust, efficient, and incorporated industry best practices. Their insights helped identify potential challenges and optimize the system for long-term performance and sustainability.

RCM Energy Services (RCM) is a firm with a history of providing a broad spectrum of energy-related services, encompassing engineering, consulting, and project management, with a strong emphasis on energy efficiency and sustainability. While their primary focus was not solely on district energy systems, RCM Energy Services possessed significant experience in designing infrastructure projects, notably for Con Edison in the New York City area. Their familiarity with Con Edison's infrastructure and regulations made their perspective invaluable during the Thermal Energy Network design stage, particularly in ensuring seamless integration and adherence to local utility practices. This specific expertise in navigating Con Edison's systems, combined with their broader energy efficiency focus, provided a crucial layer of review, complementing KWL's district energy proficiency.

5.3.2. Data Gathering

As with any large infrastructure project, the UTEN design process integrated the results of substantial data gathering, site verifications, and analysis. These included:

1) Test Borehole

A test borehole is critical to accurately establish the thermal properties, drilling conditions, and geologic profile of the subsurface within the project area. The depth to bedrock is critical for accurate construction cost estimating to determine the depth of steel casing needed per borehole/loop. The amount of water production during drilling is used to correctly size the water management and disposal system on site. The detailed drill log shows the speed of drilling, along with any issues encountered, to allow future bidders on the Pilot to have as much information as possible to provide accurate pricing and reduce change order risk during the construction phase.

In November 2024, one test borehole was drilled at the Doles Recreation Center grassy field along S 7 Ave, north of W 4 Street. The drill depth was 880 feet, using the air rotary casing hammer drilling method. An 850-foot test loop (1.5-inch HDPE SDR 11 pipe u-bend) filled with

water was inserted into the borehole and the annular space between the pipe and the borehole was filled with grout. After installation, the test loop was pressure tested to ensure the pipe retained its integrity. Table 3 shows more of the parameters that were measured.

Table 3: Test Borehole Parameters Measured at the Doles Recreation Center

Test borehole parameter	Depth (feet)
Bore drill down	880
Bedrock encountered	24
6-inch casing	40
Static groundwater	29
Inserted test loop	850

A thermal conductivity test was conducted 4 weeks after grouting, following CSA C448 standards, producing the thermal properties shown in Table 4. A thermal conductivity test is used to calculate how many boreholes are needed for the projected customer load. If approved for Stage 3, each bore field will undergo a thermal conductivity test to confirm or update the thermal energy resource modeling. During bore field construction, thermal conductivity tests will be performed to confirm thermal conductivity of each bore field.

Table 4: Summary of Formation Thermal Properties Test Results

Parameter	Test Loop TB-1
Formation Thermal Conductivity	1.74Btu/hr-ft-°F
Formal Thermal Diffusivity	0.97 ft^2/day
Mean Earth Temperature	56.4 °F

After drilling the borehole and prior to installing the test loop, the Company hosted the United States Geological Survey (USGS) to conduct a geophysical-log analysis to understand the physical and geological properties of subsurface formations. The USGS captured 360-degree ultrasound and downhole camera imaging of almost the full depth of the borehole (877 ft) before the test loop was inserted. The USGS (calipered) measured the diameter of the bore hole and logged the temperature, conductivity, resistivity (natural gamma radiation), groundwater flow, and fracture zone transmissivity. The USGS measured and plotted the borehole deviation, showing a 51-foot horizontal deviation of the borehole at a depth of 877 feet. The borehole remained within the physical footprint of the property, showing value in downhole imaging. Figure 3 shows the 3-D imaging developed by the USGS, down to a depth of 877 feet. The geophysical-log analysis

confirmed the existence of fracture zones, which were the sources of water production during drilling, and showed strike and dip of foliation of the bedrock which aligned with the direction of the borehole deviation.

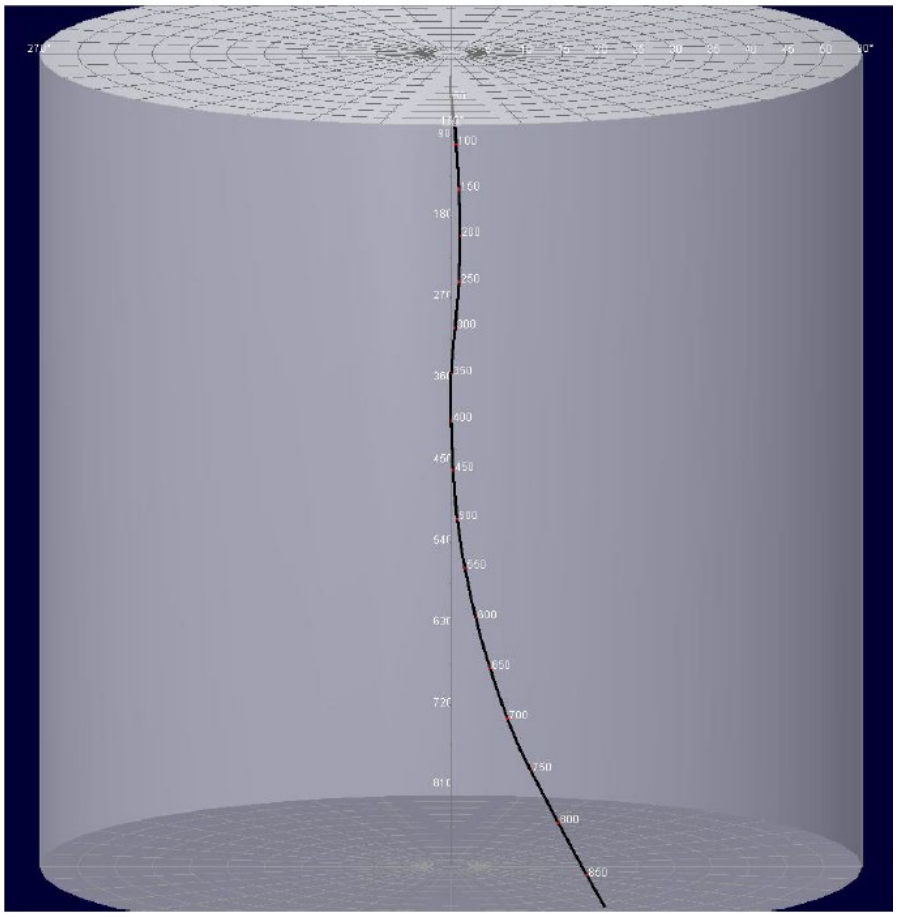

Figure 3: Test Borehole Deviation, 3-D Cylindrical Plot Produced by the USGS

2) Test Pits

To inform the final engineering design of the Pilot, Con Edison conducted four exploratory test pits along the proposed route of the UDS to determine if there was sufficient space underground to place UTEN UDS mains, with offsets around existing infrastructure. Test pits are essential for:

- **Verifying Utility Records:** While utility mark-outs and historical utility plates provide a preliminary understanding of subsurface conditions, they are often outdated or incomplete. Test pits confirm the actual location, depth, and condition of existing utilities, reducing the risk of unexpected conflicts during construction.

- **Refining Design:** The findings from the test pits allowed the engineering team to adjust the UDS routing and depth to avoid utility relocations, minimize construction delays, and reduce costs. This proactive approach ensures that the final design is both technically feasible and constructible.
- **Ensuring Safety and Compliance:** By identifying potential environmental or safety hazards—such as contaminated soil or proximity to critical infrastructure—test pits help ensure that construction activities can proceed safely and in compliance with all applicable regulations.

In the early phase of the design stage, the Company identified an imminent paving project along W 3 Street by Westchester County. To mitigate potential conflicts in the most congested segment of the Pilot project area, the four test pit excavations were expedited to confirm that utility interference would not impede UDS pipe routing. This proactive measure eliminated the need to disturb newly paved streets in the future.

Following an additional two months of analysis, no further test pits were deemed necessary to de-risk UDS pipe routing for the Mount Vernon Pilot. Figure 4 shows the location of the four test pits and the potential utility conflicts and the subsurface conditions. The excavations confirmed adequate space for UDS installation, which could not be verified without physical investigation due to the complexity of existing underground infrastructure and the urgency imposed by the paving schedule.

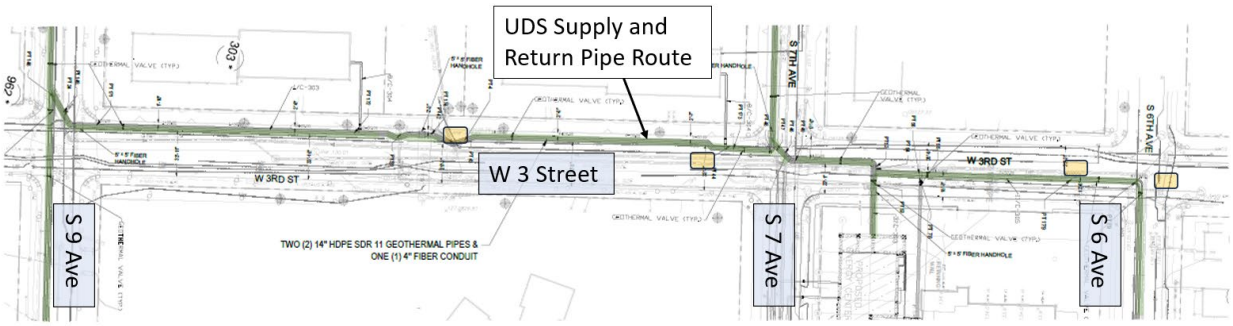

Figure 4: UDS Pipe Route and Test Pits

Figure 4 shows the UDS supply and return pipe in green, and four test pits marked in orange. These test pits were completed against a competing paving schedule and in the early phases of the design, while the Company was debating between a one-pipe and two-pipe system and designing two separate UDS loops. Overall, 181 utility crossings were identified for the UDS

pipe routing. Based on existing utility drawings and field measurements of existing valves, manhole covers and catch basins, the UDS will be offset around existing subsurface infrastructure to maintain a four-foot cover minimum. This approach will eliminate the need to reroute existing pipes and conduits and will rely on the flexibility to route the UDS within available space, with offsets where required.

3) Geotechnical Borings

To support the structural design and construction planning of the new Energy Center (EC), five geotechnical borings were conducted on the designated site adjacent to the Mount Vernon Fire Station. These borings were essential to assess subsurface conditions and inform the foundation design, excavation strategy, and structural integrity of the facility.

Using a drill rig, 4-inch diameter boreholes were drilled to a depth (10 to 40 feet) sufficient to characterize the soil profile and identify key geotechnical parameters. Of the five boreholes, one was used as a groundwater observation well. Groundwater was measured at a depth of 3-12 feet below ground surface. In accordance with standard ASTM D1586, Standard Penetration Tests with split-spoon sampling were conducted in each boring, which allowed for the collection of soil samples at regular intervals.[9] These samples were visually classified in the field in accordance with the Burmister soil classification system. Representative soil sample from each split-spoon were subsequently analyzed off-site to determine grain size distribution, moisture content, and bearing capacity.

The geotechnical investigation confirmed that the subsurface conditions were suitable for the planned two-story mixed-use structure, which will house critical UTEN infrastructure including UDS pumps, bore field pumps, air-source heat pump heat exchangers, SCADA control system components, and backup power equipment. The foundation of the Energy Center building may be spread type, which is a relatively simple and cost-effective shallow foundation that distributes the weight of the structure over a wide area of soil. While the Energy Center building lies outside of the Federal Emergency Management Agency (FEMA) flood zone, due to the high water table, the Energy Center foundation slab and water proofing will comply with Section 1805 of the New York State Building Code.[10] The geotechnical findings also informed the design of excavation

[9] ASTM International, *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*, ASTM D1586/D1586M-18e1 (May 3, 2022), https://www.astm.org/d1586_d1586m-18e01.html (ASTM D1586).
[10] 2020 Building Code of New York State, § 1805, *Soils and Foundations* (effective May 12, 2020), https://codes.iccsafe.org/content/NYSBC2020P1/chapter-18-soils-and-foundations (2020 NYS Building Code).

support systems and ensured compliance backfilling requirements as well as applicable building codes and safety standards.

Following completion of the borings, the drill holes were backfilled, and the site was restored to its original condition. The results of this investigation have been integrated into the final engineering design of the Energy Center Building, ensuring a stable and resilient foundation for this critical component of the Mount Vernon UTEN. Figure 5 shows the location of the borings.

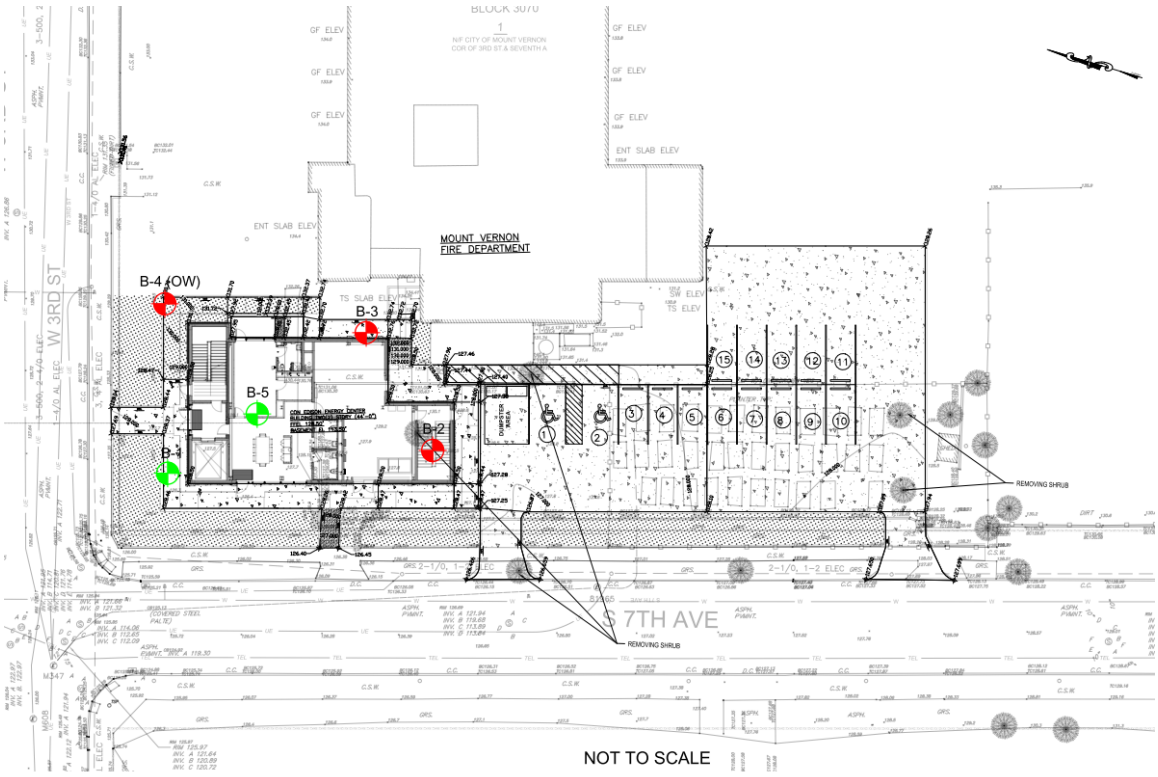

Figure 5: Geotechnical Boring Locations and Soil Sampling

4) Hydraulic Analysis

A hydraulic analysis was performed under the InfoWater software platform (formerly Innovyze) to verify the hydraulic performance of the water distribution network: across two pressure zones (22 psig difference supply and return UDS mains), through ground loop piping, and to the customer heat exchanger. Heat exchangers for all buildings were simulated in the model, with settings matching flow load requirements of each of the 43 buildings in the Pilot. The hydraulic network model was utilized as a tool to inform the selection of UDS and bore field pumps, heat exchangers, and flow control valves. The hydraulic analysis performed for the 100% Construction Documents shows that the flow of water through the network meets flow and

pressure requirements under heating, cooling, minimum load, and shoulder season operational modes. The model verified pump selections to ensure performance for current as well as anticipated full build out scenarios. See more detailed hydraulic information in the Hydraulic Analysis Memorandum in the Appendix.

5) Heat and Mass Flow Balance

A heat and mass flow balance test was performed for the 60%, 90% and 100% Design in order to verify that the Pilot is technically feasible. The load requirements of each customer were modeled under heating, cooling, minimum load, and shoulder season operational modes. The four bore fields are able to inject/absorb sufficient heat from the Utility Distribution System to meet the projected customer heating, cooling, and DHW annual and coincident peak loads.

6) Pipe Stress Analysis

A pipe stress analysis was performed for the following types of pipes in the Mt. Vernon Pilot:

- Polypropylene SDR 11 – aquatherm pipe – to be used for aboveground piping inside the energy center building, the bore field ETSs, and possibly within customer buildings
- Carbon steel – schedule 40 – to be used within the energy center for ASHP connection

The guiding standard for pipe selection was ASME B31.3 (Process Piping).[11] This standard was selected as it aligns with the pressure (less than 168 psig) and temperature ranges (30 to 100 deg F) that are permissible within the Mt. Vernon geothermal system.

The American Society of Civil Engineers (ASCE) 7 – Minimum Design Loads and Associated Criteria – was used as a framework and rulebook for load analysis of all types of pipe material.[12] Due to the complexity of the ASHP piping in the Energy Center building, Caesar II modeling software was used to analyze the carbon steel pipe run. The purpose of the pipe stress analysis was to check allowable stresses resulting from various factors like internal pressure, temperature changes, and external loads. Where the analysis showed pipe stress was possible, the required supports, anchors, offsets were implemented in the pipe design and layout. Both the manual and software calculations showed that the pipe design satisfies ASME B31.3 code requirements. Pipe stress analysis was not performed for the UDS high density polyethylene

[11] Am. Soc'y of Mech. Eng'rs, Process Piping, ASME B31.3-2024 (2024), https://www.asme.org/codes-standards/find-codes-standards/b31-3-process-piping/2024

[12] Am. Soc'y of Civil Eng'rs, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, ASCE/SEI 7-22 (2022), https://www.asce.org/publications-and-news/asce-7.

(HDPE) pipe, as it will be direct buried and fully supported by the soil. Per the American Water Works Association (AWWA) M55 manual, HDPE piping buried between 3 and 25 feet in depth does not require a pipe stress calculation.[13] Furthermore, for thermal expansion, the stress caused by fully restrained ends does not exceed the ASME B31.3 code allowable for the given temperature range. For a full pipe stress analysis, please refer to the Pipe Stress Memorandum located in the Appendix.

5.3.3. Existing Equipment in the Properties Involved

The Mount Vernon Pilot footprint contains a wide range of buildings that will connect to the UTEN. The buildings highlighted below are potential customers of the Pilot. The summary of existing equipment for potential customer buildings are found in Table 6. For more information on all buildings connecting to the UTEN, see Appendix items 65-99.

Table 5: Building Characteristics of Potential Mount Vernon Customers

Building Name	Existing Equipment	Heating Fuel Source	# of Units
Fire Station	Multizone unit, rooftop units, unit heaters, ventilators	Fuel oil	N/A
Doles Recreation Center	Steam boiler, gas-fired rooftop units	Gas	N/A
Medical Center	Gas-fired rooftop package units, gas DHW heater	Gas	N/A
L.I.V.E. Church	Fuel-oil furnaces, window AC units	Fuel oil	N/A
Church of Sts John, Paul, & Clement	Gas boiler, radiators, gas DHW heater	Gas	N/A
Macedonia Baptist Church	Direct expansion air handling units (DX AHUs) with gas duct furnaces, radiators, gas DHW heater	Gas	N/A
Greater Centennial Homes	Hydronic baseboard, wall AC units, gas DHW boilers	Gas	4 buildings
Ebony Gardens	Baseboard heating, window AC units, gas-fired boilers	Gas	6 buildings
Residential Homes (1-4 Family)	Forced air or baseboard systems, window AC units	Various (ASHP, Gas, Fuel oil)	26 buildings

[13] Am. Water Works Ass'n, PE Pipe—Design and Installation, Manual M55, 2d ed. (2020), https://store.awwa.org/M55-PE-Pipe-Design-and-Installation-Second-Edition.

5.3.4. Analysis

Thermal Energy Resource Quantification

The thermal energy capacity of the Mount Vernon UTEN is defined in two key dimensions: peak capacity and annual capacity.

- Peak capacity refers to the system's ability to extract or reject the maximum amount of energy from the bore fields during periods of highest heating or cooling demand.
- Annual capacity reflects the system's ability to absorb or release sufficient energy over the course of a year to maintain loop temperatures within the desired operational range.

The UTEN bore fields have been designed to meet both of these criteria for the connected customer base consisting of 43 buildings. The system includes four bore fields comprising 127 vertical boreholes, each approximately 850 feet deep. These bore fields are thermally modeled to ensure that the system can deliver reliable heating and cooling throughout the year without exceeding thermal limits. The minimum water temperature entering the UDS side of the customer heat exchanger is 35 deg F and the maximum water temperature entering the UDS side of the customer heat exchanger is 85 deg F. To validate the thermal performance over time, Load Duration Curves (LDCs) have been developed. These curves illustrate the average minimum and maximum temperatures of the fluid entering and leaving the bore fields over a 20-year period. The LDCs provide insight into the earth's thermal response and help ensure that the system remains balanced and efficient under varying seasonal loads. Thermal energy resource modeling was conducted using hourly customer building load profiles derived from TRACE 3D Plus simulations, which incorporate local weather data and building usage patterns. These simulations were further refined using customer energy usage data provided by Con Edison. The customer load profiles were aggregated and input into the ground loop design (GLD) software, which simulated the earth's response to the customer heating and cooling loads and predicted the bore field entering and leaving water temperatures over a 20-year (240 month) period. Figure 6 shows the output of the GLD model in the form of a ground heat exchanger response plot.

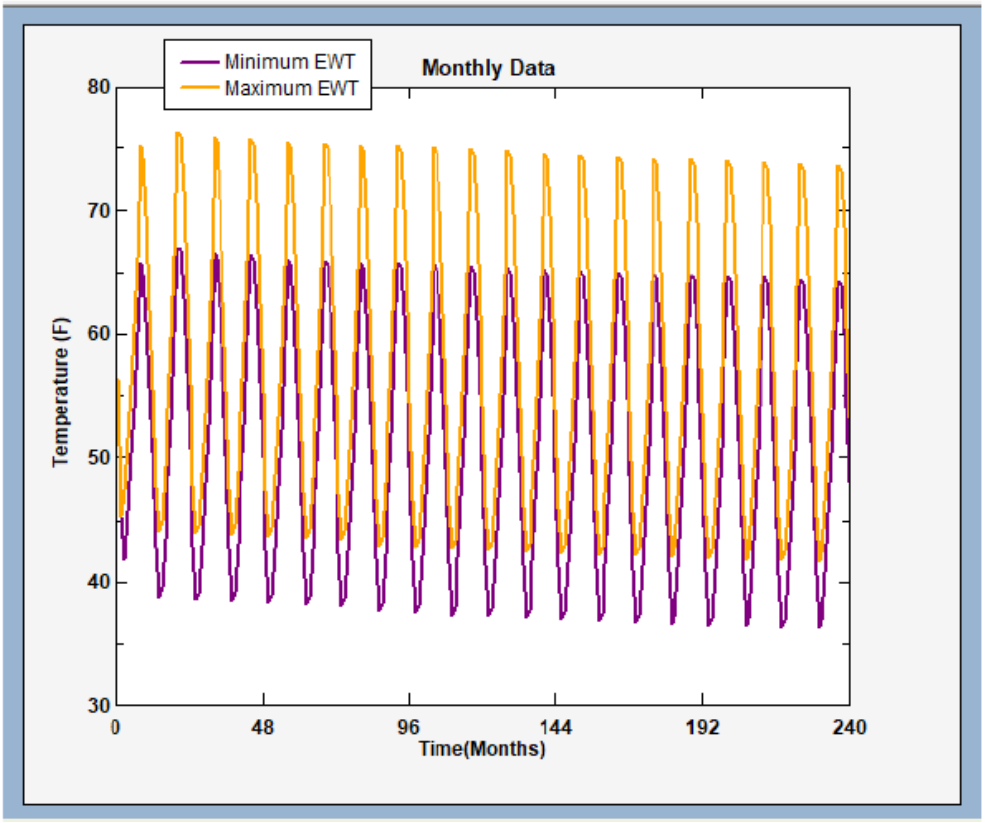

Figure 6: 20-Year Ground Heat Exchanger Response Plot for 4 Bore Fields

The slight downward slope of the plot indicates a net decrease in temperature of the bore fields over a prediction time of 20 years. While the maximum and minimum entering water temperature remain within the 35-85 deg F range, the decrease in bore field temperature can be balanced by either constructing another bore field or with the use of ASHP during the shoulder seasons. Due to bore field construction costs, during the first few years of the Pilot, the ASHPs will be utilized to recharge the bore fields annually, with an available 3225 MBH of capacity available as currently designed, which represents 4% of the heating load.

The thermal modeling confirms that the bore fields, in conjunction with the UDS, are capable of supporting the projected peak and annual heating and cooling loads of the pilot participants. As part of the construction phase, thermal conductivity tests (TCTs) will be conducted at each bore field to confirm or update the thermal energy resource assumptions. This modeling and validation process ensures that the Mount Vernon UTEN is engineered for long-term thermal stability, operational resilience, and scalability for future customer connections.

Customer Load Assumptions and Modeling

Residential building heating and cooling loads are developed in conformance with ACCA Manual J Residential Load Calculation, Eighth Edition.[14] The loads were developed using representative models and scaled based on square footage. The commercial building heating and cooling loads were developed based on 2024 ASHRAE Standard 183 Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings.[15] Building hourly heating and cooling loads are modeled using TRACE 3D Plus, which is built on the Department of Energy's (DOE) EnergyPlus engine. The software simulates hourly heating and cooling loads based on ambient hourly weather data and interior usage schedules. The ambient hourly data assumed for this site is derived from the Westchester County Airport (TMYx) dataset, which is publicly available from National Renewable Energy Laboratory. The interior usage (occupancy, lighting plug loads, laundry, cooking) intensity and schedules are based on published data from ASHRAE.[16]

Anticipated design loads for all 43 buildings that can potentially connect to the UTEN Pilot have been established by thermal modeling and refined based on customer usage data provided by Con Edison as follows: full electrical metered data was provided; partial natural gas metered data was provided, the exception being one long term out of service gas meter; partial fuel-oil bills were provided for analysis, the exception being one customer who was not able to locate their bills. Table 5 provides a summary of projected connected customer loads.

Table 6: UTEN Connected Customer Loads

UTEN Scenario	Conditioned Area Sq. Ft.	Peak Cooling kBTUH	Peak Heating kBTUH	Peak DHW kBTUH	Annual Cooling mmBTU	Annual Heating mmBTU	Annual DHW mmBTU
Pilot	432,170	7,546	6,683	2,304	8,465	10,706	3,688

Domestic Hot Water Demand Quantification

Domestic Hot Water (DHW) demand was quantified as part of the broader thermal load modeling effort for the Mount Vernon UTEN Pilot. The modeling approach followed industry-

[14] Air Conditioning Contractors of America, Manual J® Residential Load Calculation, 8th ed., ANSI/ACCA 2 Manual J – 2016 (2016), https://www.acca.org/standards/technical-manuals/manual-j (Manual J).
[15] American Society of Heating, Refrigerating and Air-Conditioning Engineers, *Peak Cooling and Heating Load Calculations in Buildings Except Low-Rise Residential Buildings*, ANSI/ASHRAE/ACCA Standard 183-2024 (2024), https://webstore.ansi.org/standards/ashrae/ansiashraeacca1832024 (ASHRAE 183-2024).
[16] ASHRAE 183-2024.

standard methodologies to ensure accurate representation of DHW usage across a diverse mix of residential and commercial buildings.

For residential buildings, domestic hot water loads were developed in accordance with the 2023 ASHRAE Applications Handbook.[17] Site visits were conducted at all 1–4 family homes to assess existing conditions and gather data on plumbing configurations, occupancy patterns, and appliance types. These inputs were used to model hourly DHW demand profiles under ambient hourly weather data derived from the Westchester County Airport (TMYx) dataset. For commercial and institutional buildings—including places of worship, the medical center, and community facilities—DHW loads were also developed using ASHRAE guidelines. Each building was visited to verify existing DHW systems and to collect data on usage patterns, fixture counts, and occupancy schedules. The DHW demand profiles were integrated into the overall thermal modeling using TRACE 3D Plus, a simulation tool built on the DOE's EnergyPlus engine. This allowed for hourly simulation of DHW loads alongside space heating and cooling, ensuring that the UTEN system was designed to meet peak and annual thermal demands holistically. See Figure 7 for monthly cooling, heating, and DHW loading.

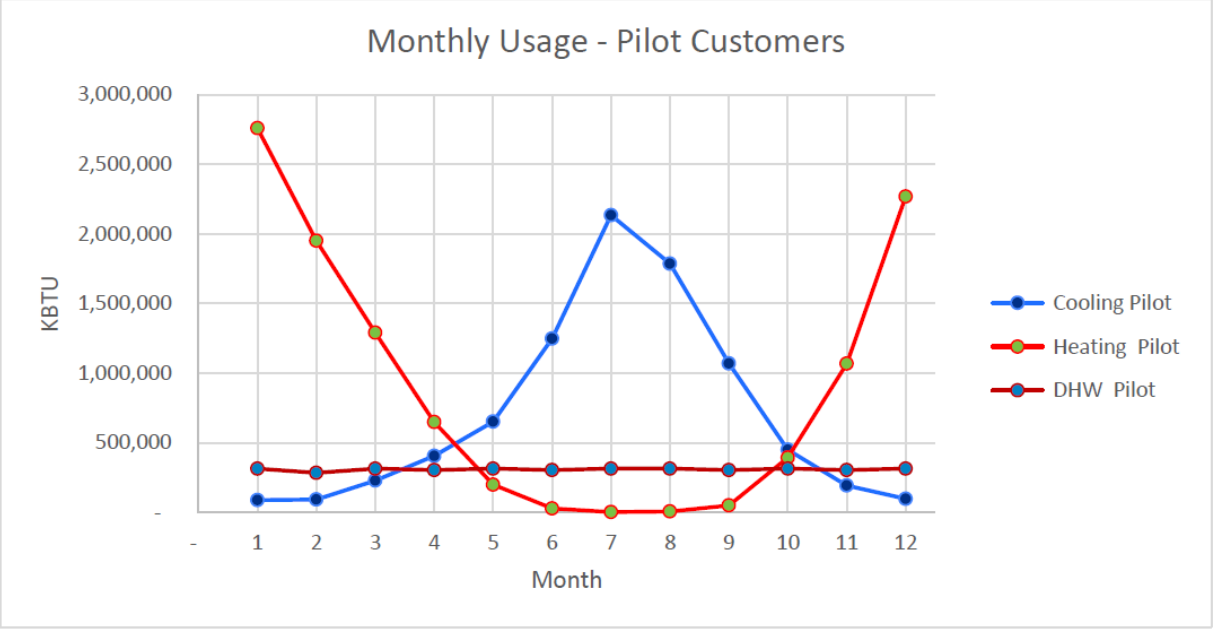

Figure 7: Monthly Coincident Peak Cooling, Heating and DHW Customer Loading

[17] American Society of Heating, Refrigerating and Air-Conditioning Engineers, *2023 ASHRAE Handbook—HVAC Applications*, https://www.ashrae.org/technical-resources/ashrae-handbook/2023-ashrae-handbook-hvac-applications (ASHRAE Applications Handbook).

The inclusion of DHW in the thermal model was an important factor in sizing the bore fields, selecting appropriate heat pump technologies, and designing the Utility Distribution System to maintain loop temperatures within operational limits year-round. This comprehensive approach ensures that the UTEN can reliably deliver DHW to all participating buildings while maintaining system efficiency and thermal balance.

5.4. Proposed Design

The Mount Vernon UTEN is engineered to deliver efficient, low-carbon heating, cooling, and DHW to a diverse mix of 43 buildings—including residential homes, multifamily complexes, community centers, and places of worship—through a closed-loop, two-pipe UDS. The system dynamically adjusts to seasonal thermal demands and is designed for future scalability into adjacent neighborhoods.

Winter Operation: Heating-Dominant Mode

During the winter, the UTEN operates in a heating-dominant mode, extracting geothermal energy from four bore fields containing 127 vertical boreholes, each approximately 850 feet deep. The process is as follows:

- **Heat Source**: The bore fields act as the primary thermal energy source, drawing stable subsurface temperatures to support space heating and DHW needs. ASHP are used during milder times to relieve annual stress on the bore fields.
- **Heat Transfer**: Thermal energy is transferred from the bore fields into the UDS via Thermal Energy Resource ETS, which house AHU, valves, expansion tanks, flush ports, metering components, and hydronic pumps.
- **Heat Distribution**: The UDS circulates a 25% propylene glycol solution between 35°F and 85°F through a closed-loop system to customer buildings.
- **Utilization**: At each building, a Customer ETS, which contains a heat exchanger, regulates flow and temperature to deliver heating via ground-source heat pumps, VRF systems, or water-to-water systems depending on the building type.
- **Control and Monitoring**: A centralized SCADA system located in the Energy Center monitors flow, pressure, and temperature. Control valves at the Energy Center and ETSs dynamically modulate flow to maintain optimal loop performance and redundancy.

Summer Operation: Cooling-Dominant Mode

In the summer, the system transitions to a cooling-dominant mode, rejecting excess heat from buildings back into the bore fields:

- **Heat Rejection**: Customer ETSs extract heat from indoor spaces and transfer it into the UDS loop.
- **Bore Field Recharge**: The bore fields absorb this heat, maintaining thermal balance over the year. ASHP are also used to relieve annual stress on the bore fields.
- **Supplemental Cooling**: During shoulder seasons or peak summer days, air-source heat pumps (ASHPs) located on the roof of the Energy Center can be activated to assist with loop temperature regulation or to recharge the bore fields.
- **Backup Measures**: The Energy Center includes provisions for roll-up rental boilers and chillers to maintain safe loop temperatures in the event of equipment failure or extreme weather conditions.

Infrastructure Integration

- **Energy Center**: A newly constructed two-story facility houses the pumps, SCADA system, ASHPs, glycol feeders, and expansion tanks. It also includes office space for the CMV's Emergency Services.
- **Customer Equipment**: Each building is equipped with a tailored ETS and internal distribution system (e.g., VRF, baseboard, or ducted systems) to match its existing infrastructure and space constraints.
- **Future Expansion**: The UDS is oversized and includes isolation valves and stub-outs at intersections to support future customer connections and network growth.

5.4.4. New Equipment

Thermal Energy Resource

The Mount Vernon UTEN employs a hybrid thermal energy strategy that integrates vertical geothermal bore fields and ASHPs located at the Energy Center. These two systems work in tandem to provide year-round heating, cooling, and DHW to a diverse set of buildings across the network.

A. Geothermal Bore Fields

The geothermal bore fields are the primary renewable energy source for the Mount Vernon UTEN, designed to exchange heat with the ground to temper the ambient loop fluid. Each borehole is constructed in a double U-bend vertical configuration, drilled to a depth of 850 feet, and spaced 20 feet apart. The piping used is 1.5-inch diameter PE 4710 high-density polyethylene

(HDPE), and the boreholes are grouted with a material that has a thermal conductivity of 1.6 Btu/(h·ft·°F). These bore fields are engineered with a 20-year design life, accounting for evolving climate conditions and equipment performance.

Site-specific testing confirmed the following thermal properties, based on the thermal conductivity test:

- Mean earth temperature: 56.4°F
- Thermal conductivity: 1.74 Btu/(h·ft·°F)
- Thermal diffusivity: 0.97 ft²/day

The pilot phase includes four bore fields—designated as Bore fields A, B, C, and D—each strategically located to optimize thermal exchange and minimize distribution losses. Bore Field A is located near the Mount Vernon Fire Station, Bore Field B is adjacent to the Doles Recreation Center, Bore Field C is situated at a playground on South 7th Avenue, and Bore Field D is at a playground on South 9th Avenue. As shown in Figure 8, the bore fields highlighted in yellow are required to meet the thermal demands of the Pilot's 432,170 square feet of conditioned space, while those in green are planned for future expansion.

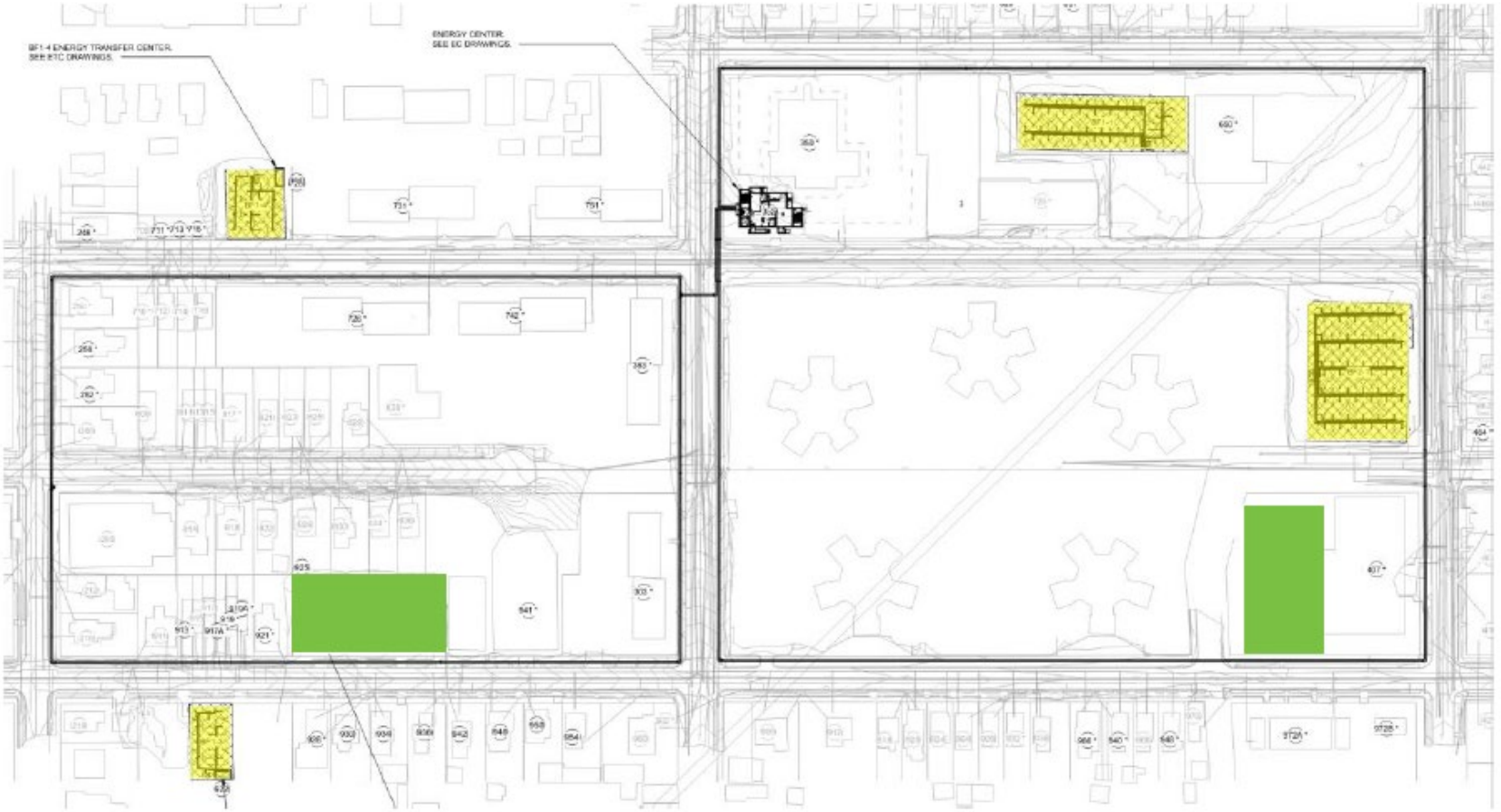

Figure 8: Four Pilot-Required and Two Future Build-Out Bore Fields

Each bore field is composed of vertical boreholes spaced 20 feet apart and drilled to a depth of 850 feet. Supporting infrastructure includes prefabricated HDPE vaults installed on concrete slabs to resist buoyancy. These vaults are equipped with lighting, ladder access, and sump provisions. Manifolds, which facilitate flow control and maintenance access, are installed either within these vaults or inside buildings, depending on the site layout.

B. Air Source Heat Pumps (ASHPs)

Air-source heat pumps located at the Energy Center serve as a supplemental thermal energy source for the Mount Vernon UTEN. These units are critical to maintaining system reliability and thermal balance throughout the year. They are designed to be utilized during shoulder seasons, when their coefficient of performance (COP) is highest, to enhance bore field recharging, but may be used to provide additional heating and cooling capacity if the geothermal bore fields are unable to meet peak thermal loads or when the loop temperature requires stabilization. By tempering the ambient loop, they ensure consistent thermal energy delivery to all connected buildings. This hybrid operation model allows the UTEN to offset seasonal imbalances and supports future scalability by reducing the need for additional bore field capacity.

Operationally, the air-source heat pumps are activated based on real-time monitoring of loop temperatures and system load. They are fully integrated with the SCADA system, which enables them to respond dynamically to fluctuations in demand and environmental conditions. This integration ensures that the UTEN can maintain service reliability even under extreme weather or load conditions, providing a resilient and adaptive energy solution for the community.

C. Combined Performance and Resilience

Together, the geothermal bore fields and air-source heat pumps form a resilient and adaptable thermal energy foundation for the Mount Vernon UTEN. This dual-source configuration maintains thermal balance throughout the year and accommodates future customer connections without diminishing system performance. By maximizing the use of renewable energy, the system significantly reduces greenhouse gas emissions. It also incorporates built-in redundancy, allowing the network to continue operating during maintenance periods or times of peak demand.

This integrated thermal resource strategy plays a central role in advancing the UTEN’s goals of delivering equitable, sustainable, and scalable energy solutions to the Mount Vernon community.

Utility Distribution System

The Mount Vernon Utility Distribution System is designed as a two-pipe, closed-loop ambient temperature network that distributes thermal energy to connected buildings. The system consists of parallel supply and return lines constructed primarily of HDPE SDR 11 pipe, buried with a minimum cover of 42 inches. The total network spans over 11,000 linear feet and is engineered to support both current Pilot loads and future expansion. The pipe materials and configurations are as follows:

- **Below-Grade Piping**: HDPE 4710 SDR 11
- **Above-Grade Piping**: Polyethylene, Schedule 10 Type 304 stainless steel, and Type K copper
- **Pipe Sizes**: 12-inch and 14-inch mains, with customer service lines ranging from 2 to 8 inches
- **Flow Rate**: 450 gallons per minute (GPM) to 3600 GPM
- **Flow Velocity**: Pipe is sized to handle 2–8 feet per second (fps), with allowances for oversizing in looped sections
- **Pressure Rating**: Up to 168 psig at 100°F
- **Temperature Range**: 35°F to 85°F

3. Heat Transfer Medium

The UDS is filled with a 25% propylene glycol solution in water, dyed yellowish green for visibility. This mixture provides freeze protection and includes corrosion inhibitors to safeguard metallic components. Chemical inhibitors used in the solution are specific to each manufacturer and include sodium tolytriazole 1H-benzotriazole, 4-methyl, and/or sodium salt in small concentrations. No odorant is added. On the customer side, a 40% propylene glycol solution is used where piping is exposed to freezing conditions.

4. System Architecture and Isolation

The Mount Vernon UTEN is designed as a two-pipe system, with parallel supply and return mains that circulate thermal energy throughout the network. This configuration supports consistent thermal delivery and simplifies system balancing across all connected buildings. To support operational flexibility and maintenance, polyethylene ball valves with riser stems are installed at every intersection, allowing for sectional isolation of the network. Each building is equipped with a curb valve at or near its service connection, enabling individual isolation when needed. Additionally, stub-outs are provided at key intersections to accommodate future network

expansion without disrupting existing service. Within the bore field ETS, bypass valves are included to manage underflow conditions and maintain stable loop performance.

5. Customer Connections

Each building connects to the UDS via dedicated service lines, see Figure 9 below for a visual representation of a service run to Ebony Gardens buildings. These include:

- **Curb Valves** for shutoff at the street
- **ETSs** located inside buildings, housing:
    - Control valves on the utility side
    - Heat Exchanger between the utility and customer piping
    - Circulator pumps on the customer side
    - BTU meters for thermal energy measurement
    - Power meters for PSC performance reporting

Figure 9: Customer Service Line Connections to the UDS Main

6. Corrosion Control Strategy

The system prioritizes corrosion-resistant materials such as HDPE, and stainless steel. Where these are not feasible, components are protected by the glycol solution's corrosion inhibitors. Epoxy-coated valves and other protective coatings are used where appropriate.

7. Leak Detection and Monitoring

The Pilot incorporates a multi-layered approach to leak detection and monitoring, combining both physical indicators and digital systems to maintain system integrity. Primary monitoring is conducted through continuous observation of system pressure and glycol feeder fluid levels. A sudden drop in pressure typically signals a major leak, which can then be isolated and located using sectional pressurization techniques. Minor leaks are identified through gradual glycol loss in feeder tanks, which trigger alarms within the SCADA system.

To enhance precision, acoustic detection methods are employed to pinpoint the location of small leaks that may not be immediately visible through pressure changes. The SCADA system plays a critical role in this framework by enabling real-time monitoring and remote diagnostics, allowing operators to respond quickly to anomalies and maintain reliable network performance.

8. Communications and Controls

A fiber optic cable is installed alongside the UDS mains that connects the bore fields to the energy center, to support:

- Pressure sensor feedback
- Control valve operation
- Pump speed modulation
- System performance analytics

This networked control system ensures consistent pressure and temperature delivery across all customer connections and supports data-driven maintenance and optimization.

9. Construction and Coordination

The construction of the Mount Vernon Pilot is guided by careful planning to support both current infrastructure needs and future scalability. The Utility Distribution System is installed with a minimum of four feet of cover to protect the piping and maintain system integrity. A minimum separation of 12 inches is maintained between the supply and return mains to support efficient thermal exchange and operational safety. During backfilling, tracer wire and caution tape are installed above the piping to aid in future identification and prevent accidental damage during excavation. Expansion tanks are sized to maintain a minimum pressure of 25 psig at the system's highest point, helping to stabilize the network under varying load and temperature conditions.

The routing of the UDS is coordinated with other ongoing infrastructure projects in the area, including sewer rehabilitation and upgrades to community facilities. This coordination

minimizes disruption, avoids conflicts with existing utilities, and supports a streamlined construction timeline.

10. System Selection Justification

A two-pipe system was selected over a one-pipe alternative to support more robust and equitable system performance. This design choice offers several operational and customer-facing advantages. It provides greater reliability and continuity of service during maintenance activities, as the supply and return lines can be isolated and managed independently. The two-pipe layout also promotes more consistent thermal delivery across all connected buildings, improving thermal equality among customers. In addition, this configuration reduces the mechanical space requirements within buildings, making it easier to integrate with a variety of existing structures. It also enhances the network's ability to collect detailed performance data and support advanced system control, which is critical for monitoring, optimization, and future scalability.

Energy Center

The Energy Center Building (ECB) is the centralized utility-owned facility for the Mount Vernon UTEN. It houses the mechanical, electrical, and control systems required to operate the UDS, manage thermal energy exchange, and ensure reliable service to all connected customers.

1. Core Equipment and Functions

The ECB includes the following major systems:

- **UDS Pumps:** Circulate fluid through the distribution system to customer ETSs.
- **Bore Field Pumps:** Circulate fluid through the geothermal bore fields to temper the ambient loop. Two of the four bore fields are directly piped into the Energy Center, with the bore field pumps being located inside the Energy Center.
- **Air-Source Heat Pumps (ASHPs):** Serve as the hybrid thermal energy component, providing supplemental heating and cooling capacity.
- **Glycol Feeders:** Maintain fluid levels and chemical balance in the loop.
- **Expansion Tanks:** Sized to maintain a minimum pressure of 5 psig at the highest point in the system and accommodate thermal expansion across the full operating temperature range.
- **SCADA Control Center:** Provides real-time remote monitoring and local control of all system components.
- **Electrical Distribution Equipment:** Powers all Energy Center systems.

- **Pressure Relief Valves:** Discharge to floor drains to protect against overpressure events.
- **Backup Generator:** Ensures continuity of operations during Energy Center building power outages.
- **Temporary Backup Boiler Connection:** Included to support system resilience during peak demand or maintenance events.

2. Environmental and Operational Design

The lower and first floor temperature is maintained between 55°F and 80°F to prevent condensation on geothermal piping. The second-floor office space temperature is maintained between 72°F and 75°F when occupied, and 60°F to 85°F when unoccupied.

3. Pumping and Redundancy Strategy

The Energy Center is designed with N+1 redundancy for critical pumping systems to ensure uninterrupted service during maintenance or equipment failure. The hydraulic analysis confirms the following:

- **UDS Pumps:** Sized to maintain a minimum 22 psi pressure differential between the supply and return line. With the return line pressure regulated at 33 psi by the expansion tank, the system is designed to deliver 55 psi downstream of the UDS pump piping.
- **Primary and Secondary Bore Field Pumps:** Each bore field includes a primary pump (return to supply) and a secondary pump (through boreholes).
- **Pump Design Points:** Vary by flow scenario (cooling, heating, shoulder seasons, minimum flow conditions), with UDS pumps operating up to 69 ft head and 1,581 gpm during peak cooling.

4. Electrical Service and Load Management

The electrical infrastructure is designed to support full building conditioning, maintaining indoor temperatures of 72°F in winter and 75°F in summer. This includes the electric load required to operate air-source heat pumps and the SCADA monitoring infrastructure housed at the Energy Center. Power monitoring is integrated with BTU and power meters at each customer ETS to provide the data necessary to comply with PSC's performance metrics.

5. Hybrid System Configuration: Air Source Heat Pumps

The UTEN incorporates a hybrid thermal energy strategy that includes air-source heat pumps as supplemental assets. These air-source heat pumps are installed at the Energy Center Building

and play a critical role in supporting the network's performance and adaptability. During periods of high demand, air-source heat pumps are not projected to be required but may be activated to supplement the capacity of the geothermal bore fields. They also help maintain loop temperature during shoulder seasons, contributing to the system's year-round stability. Additionally, the air-source heat pumps' infrastructure is designed with scalability in mind, allowing for future expansion of customer connections without requiring additional bore fields.

This hybrid configuration enhances the flexibility of the UTEN, reduces dependence on ground exchange during shoulder seasons, and strengthens the system's ability to operate reliably under varying temperature and load conditions. The Energy Center Building, which houses the air-source heat pumps and other critical infrastructure, also functions as a UTEN customer. Its first floor includes office space for the Company's operations and maintenance staff, while the second floor is designated for use by the CMV's Emergency Management personnel. Figure 10 provides a model-generated ortho view of all three floors of the Energy Center.

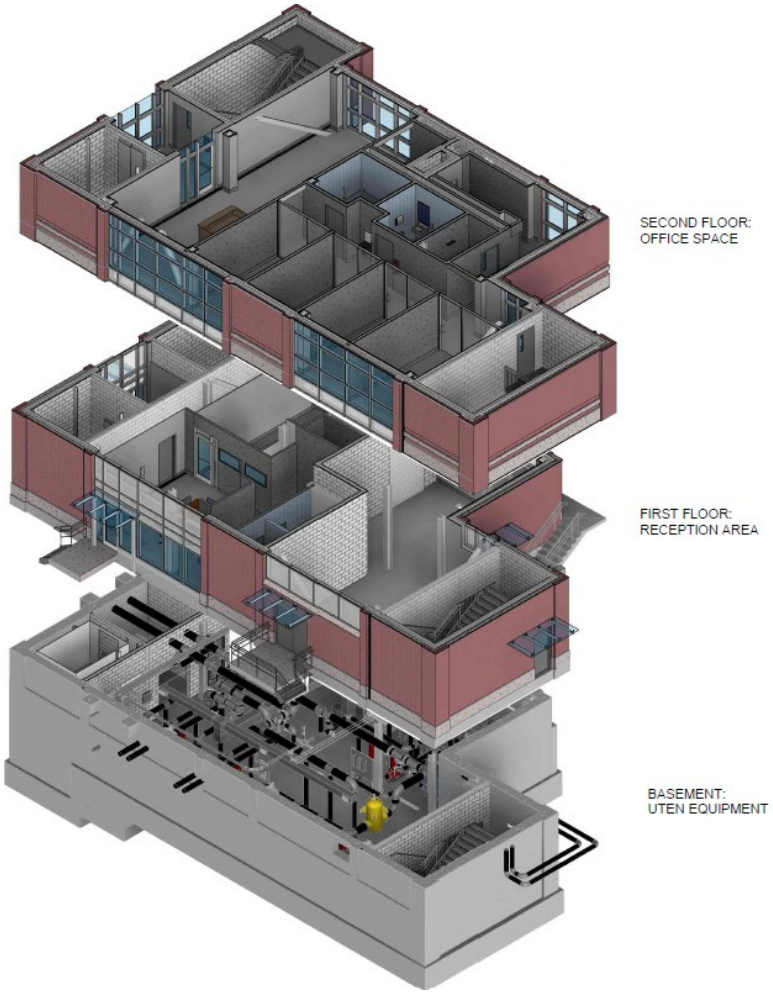

Figure 10: Energy Center Building Model Generated Ortho View

Customer Equipment

The Mount Vernon UTEN will seek to connect 42 existing buildings during the Pilot. The Mount Vernon Pilot's Customer equipment providing DHW, space heating, and cooling will begin at the isolation valve on the customer side of the ETS heat exchanger. Figure 11 shows a typical single-family residential building connection to the UTEN. The point of demarcation is the valve on the customer side of the heat exchanger.

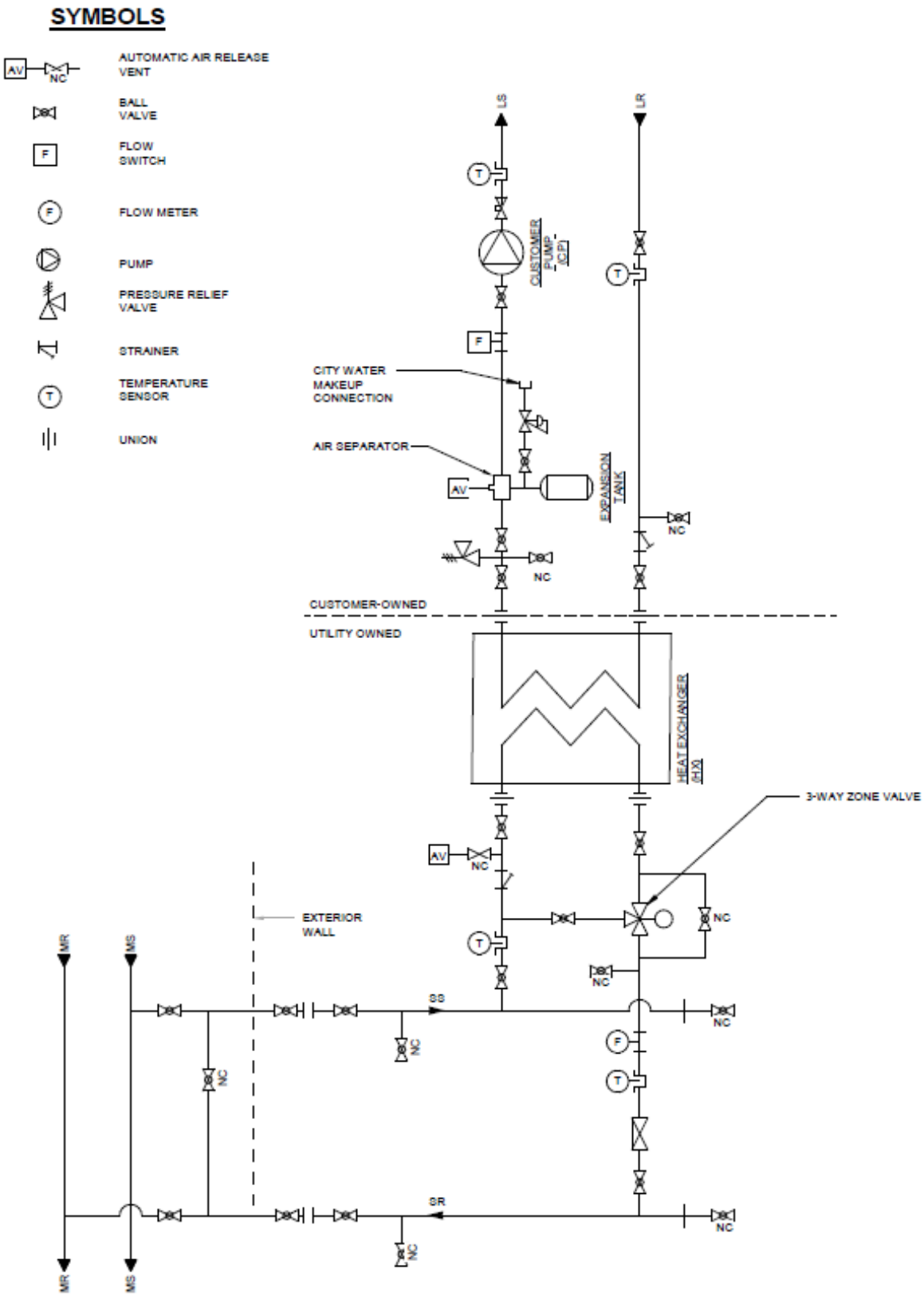

Figure 11: Typical Customer Connection to the UTEN and Demarcation Point

Customer-sided equipment will include supply and return piping, valves, heat pumps, DHW tanks and HVAC mechanical components and controls needed to operate the customer side of the UTEN. For the residential buildings, Ebony Gardens (a multifamily complex), and the religious buildings, a VRF system installed downstream of the customers' heat pump(s) will distribute the thermal energy as per the customers' specified settings. For the Doles Center, Fire Station, and Medical Center, a condenser water system heated and cooled by the UDS will be the source of heating and cooling in the building. Greater Centennial Homes (a multifamily complex) will be heated and cooled by ground-source heat pump console units. Any legacy heating/cooling systems that exist at UTEN customer premises will be disconnected.

The heating and cooling needs of each building are designed to be met fully via their connection to the UTEN. An ETS will be located within each of the customers buildings, connecting them to the UDS. Each ETS will include a control valve, heat exchanger, and BTU meters. Customers will have control over their individual heating and cooling use, while Con Edison will retain the ability to monitor consumption data for system oversight and performance tracking. Table 7 provides a summary of existing and proposed heating, cooling, and DHW equipment.

Table 7: Proposed Equipment by Building

Building Name	Existing Equipment	Proposed Equipment
Fire Station	Fuel-oil multizone unit, rooftop units, unit heaters, ventilators	Ground source heat pumps (packaged, horizontal, console-type), electric resistance heaters, GSHP DHW heater with auxiliary electric resistance hot water storage tank *Redundant heat exchangers and pumps
Doles Recreation Center	Steam boiler, gas-fired rooftop units for heating and cooling	Multizone units with condenser water, electric resistance heaters, GSHP DHW heater with auxiliary electric resistance hot water storage tank *Redundant heat exchangers and pumps
Medical Center	Gas-fired rooftop package units for heating and cooling, gas DHW heater	Rooftop units with condenser water, supplemental electric resistance heaters, GSHP DHW heater with auxiliary electric resistance hot water storage tank *Redundant heat exchangers and pumps
L.I.V.E. Church	Fuel-oil furnaces, window AC units, very small DHW load	VRF system, point-of-use DHW heaters at lavatories

Church of Sts John, Paul, & Clement	Gas boiler, radiators, gas DHW heater. No cooling present	VRF system, point-of-use DHW heaters at lavatories
Macedonia Baptist Church	DX AHUs with gas duct furnaces, radiators, gas DHW heater	Water source AHUs and supplemental VRF system, water source DHW heat pump with auxiliary electric resistance heaters
Greater Centennial Homes	Hydronic baseboard heating, wall AC units, gas DHW boilers	Console unit, GSHP DHW heater with auxiliary electric resistance hot water storage tank
Ebony Gardens	Hydronic baseboard heating, window AC units, gas-fired boilers	Individual VRF systems with a condenser per apartment, shared GSHP DHW heater with auxiliary electric resistance hot water storage tank
Residential Homes (1-4 Family)	Forced air or baseboard systems, ASHP, window DX AC units	Geothermal heat pumps some of which serve VRF systems, GSHP/electric hybrid DHW heaters

Fire Station

The Mount Vernon Fire Station will undergo a comprehensive mechanical system retrofit as part of its integration into the UTEN. This conversion will eliminate on-site fossil fuel combustion for space heating and DHW, replacing it with a fully electrified system connected to the UTEN's ambient loop.

Heating and Cooling System Replacement

The existing domestic water heater and hot water boiler located in the basement mechanical room will be removed. In their place, a new condenser water system connected to the UTEN's UDS will serve as the primary source for both heating and cooling throughout the building.

- A standalone ground source heat pump domestic water heater will be installed to provide DHW. This unit will be paired with an auxiliary electric resistance storage tank to ensure sufficient capacity and temperature maintenance during peak demand periods.
- The multizone air handling unit in the boiler room, which currently serves the first floor, will be replaced with a ground source packaged unit designed to operate on the condenser water loop.
- Rooftop units serving the second floor will also be replaced with new ground source packaged equipment, ensuring consistent performance and compatibility with the UDS.

Space Conditioning Upgrades

- In the Apparatus Bay, the existing unit heaters will be removed and replaced with horizontal heat pumps. These units are selected for their ability to efficiently condition large, open spaces with high ceilings.
- Classroom unit ventilators will be upgraded to console-type heat pumps, offering improved thermal control, quieter operation, and better integration with the new system.
- Vestibule and stairwell heaters will be replaced with electric resistance units, which are simple, reliable, and effective for intermittent use in transitional spaces.

Controls and Monitoring

A building automation system (BAS) will be installed to monitor and control all new mechanical systems within the Fire Station. While the BAS will provide local control and optimization of HVAC and DHW systems, it will operate independently and will not be integrated with the UTEN's SCADA platform. This separation ensures that the building maintains autonomous control over its internal systems while still benefiting from the centralized thermal energy supply provided by the UTEN.

The Doles Recreation Center

The Doles Recreation Center will undergo a full mechanical system retrofit to transition from fossil fuel-based heating and DHW systems to a fully electrified solution connected to the UTEN. This upgrade will improve energy efficiency, reduce greenhouse gas emissions, and enhance thermal comfort for building occupants.

Heating and Cooling System Replacement

The existing steam boiler, gas-fired rooftop units, and domestic water heater will be removed. These systems will be replaced with a new condenser water system connected to the UTEN's UDS, which will serve as the centralized source for both heating and cooling throughout the facility.

- A standalone ground source heat pump domestic water heater will be installed to provide DHW. This unit will be paired with an auxiliary electric resistance storage tank to ensure consistent hot water availability during peak demand periods.
- The existing multizone gas-fired rooftop units, which currently serve as the primary heating and cooling systems for the building, will be replaced with new multizone units designed

to operate on the condenser water loop. These replacements will maintain the building's zoning and airflow characteristics while improving energy performance.

Space Conditioning Upgrades

Vestibule and stairwell heaters will be replaced with electric resistance units. These are well-suited for intermittent use in transitional spaces and provide reliable, low-maintenance heating.

Controls and Monitoring

A BAS will be installed to monitor and control the new HVAC and DHW systems. The BAS will operate independently and will not be integrated with the UTEN's SCADA platform. This approach allows the Doles Center to maintain localized control of its internal systems while benefiting from the centralized thermal energy supply provided by the UTEN.

Medical Center

The Medical Center will undergo a full mechanical system retrofit to transition from fossil fuel-based heating and DHW systems to a fully electrified solution connected to the UTEN. This conversion will improve energy efficiency, reduce greenhouse gas emissions, and enhance thermal comfort and reliability for patients, staff, and visitors.

Heating and Cooling System Replacement

The existing gas-fired rooftop package units and gas-fired domestic water heater with an auxiliary storage tank will be removed. An abandoned steam boiler currently located in the mechanical room will also be decommissioned and left in place or removed depending on final construction logistics.

A new condenser water system connected to the UTEN's UDS will serve as the centralized source for both heating and cooling throughout the facility.

- A standalone ground source heat pump domestic water heater will be installed to provide DHW. This unit will be paired with an auxiliary electric resistance storage tank to ensure consistent hot water availability during peak demand periods.
- The existing multizone gas-fired rooftop units, which currently serve as the primary heating and cooling systems for the building, will be replaced with new rooftop units designed to operate on the condenser water loop. These replacements will maintain the building's

zoning and airflow characteristics while improving energy performance and eliminating on-site combustion.

Space Conditioning Upgrades

Vestibule and stairwell heaters will be replaced with electric resistance units. These are well-suited for intermittent use in transitional spaces and provide reliable, low-maintenance heating.

Controls and Monitoring

A BAS will be installed to monitor and control the new HVAC and DHW systems. The BAS will operate independently and will not be integrated with the UTEN's SCADA platform. This approach allows the Medical Center to maintain localized control of its internal systems while benefiting from the centralized thermal energy supply provided by the UTEN.

Ebony Gardens – (6-Building Affordable Housing Community)

The Ebony Gardens complex, consisting of six multifamily residential buildings, will undergo a full mechanical system conversion to transition from fossil fuel-based heating and limited cooling to a fully electrified, utility-supplied thermal energy solution. This retrofit is part of the Mount Vernon UTEN initiative and is designed to improve energy equity, reduce emissions, and enhance year-round comfort for residents.

Heating and Cooling System Replacement

Each building currently uses a hydronic baseboard heating system served by gas-fired boilers located in the basement. These boilers will be decommissioned and removed. Cooling is currently provided through window air conditioning units, with penetrations in bedrooms and living rooms; however, only about half of the units currently utilize air conditioning.

A new condenser water system connected to the UTEN's UDS will serve as the centralized source of heating and cooling for all six buildings.

- Each apartment will be individually conditioned using a VRF system. These systems will be water-cooled using the UTEN condenser water loop, eliminating the need for outdoor air-cooled condensers and improving energy efficiency.
- The VRF systems will provide both heating and cooling, offering residents year-round thermal comfort with zoned control in each apartment.

Domestic Hot Water System

Domestic hot water will be provided by a shared standalone ground source heat pump water heater system, located in each building's mechanical space. These systems will be paired with auxiliary electric resistance storage tanks to ensure adequate hot water supply during peak usage periods.

Controls and Monitoring

Each VRF system will be controlled locally within the apartment units. No centralized BAS is planned for these buildings, and there will be no integration with the UTEN SCADA platform. This approach simplifies operations while maintaining flexibility and control at the unit level.

L.I.V.E. Church

The L.I.V.E. Church will undergo a full mechanical system conversion to transition from fuel-oil-based heating and limited cooling to a fully electrified thermal energy solution connected to the UTEN. This retrofit will improve comfort, reduce emissions, and support the church's ongoing renovations and community functions.

Heating and Cooling System Replacement

The existing heating system consists of two fuel-oil-fired furnaces—one serving the first floor and the other serving the second floor. These will be removed as part of the conversion. Cooling is currently provided by window units, including two wall-mounted units on the first floor that are insufficient during peak summer occupancy. These units are in the process of being replaced with air-source heat pumps.

A new condenser water system connected to the UTEN's Utility Distribution System will serve as the centralized source for both heating and cooling.

- The building will be conditioned using a VRF system. This system will be water-cooled via the UTEN condenser water loop, eliminating the need for outdoor air-cooled condensers and improving energy efficiency.
- The VRF system will provide zoned heating and cooling throughout the church, improving comfort and reducing energy use.

Domestic Hot Water System

Domestic hot water demand is minimal and limited to two bathrooms. This load will be met using point-of-use electric water heaters installed at each lavatory, offering a simple and efficient solution without the need for centralized hot water distribution.

Mechanical Space and Integration

A dedicated mechanical space for the ETS and the VRF condenser unit will be identified in coordination with the building owner. This space will house the equipment necessary to interface with the UTEN and support the building's internal systems.

Controls and Monitoring

The VRF system will be controlled locally. No centralized BAS is planned, and there will be no integration with the UTEN SCADA platform. This approach simplifies operations while maintaining flexibility and control within the building.

Church of St. John, Paul, and Clement

The Church of St. John Paul and Clement will undergo a full mechanical system conversion to transition from fossil fuel-based heating and DHW systems to a fully electrified thermal energy solution connected to the UTEN. This retrofit will improve energy efficiency, reduce emissions, and provide year-round comfort for congregants and staff.

Heating and Cooling System Replacement

The existing heating system consists of a natural gas-fired hot water boiler that supplies radiators in both the basement and worship areas. This boiler will be removed as part of the conversion. The building currently has no cooling system.

A new condenser water system connected to the UTEN's UDS will serve as the centralized source for both heating and cooling.

- The building will be conditioned using a VRF system. This system will be water-cooled via the UTEN condenser water loop, eliminating the need for outdoor air-cooled condensers and improving energy efficiency.
- The VRF system will provide zoned heating and cooling throughout the church, enhancing comfort in both the worship and support spaces.

Domestic Hot Water System

Domestic hot water is currently provided by a single gas-fired water heater. This will be replaced with point-of-use electric water heaters installed at lavatories. This approach is well-suited to the church's limited hot water demand and simplifies installation and maintenance.

Controls and Monitoring

The VRF system will be controlled locally within the building. No centralized BAS is planned, and there will be no integration with the UTEN SCADA platform. This configuration allows for straightforward operation while maintaining compatibility with the centralized thermal energy supply.

Macedonia Baptist Church (New Sanctuary and Old Sanctuary)

Macedonia Baptist Church comprises two distinct but coexisting spaces: a newer sanctuary and an older sanctuary. Both are actively used and will be included in the comprehensive mechanical system conversion as part of the Mount Vernon Utility Thermal Energy Network (UTEN) initiative. This retrofit will transition the church from fossil fuel-based systems to a fully electrified thermal energy solution, improving energy efficiency, reducing emissions, and enhancing comfort for congregants.

Existing Conditions

- The **new sanctuary** is currently conditioned by two air-source DXAHUs, each equipped with gas-fired duct furnaces for heating.
- The **old sanctuary** is cooled by three air-cooled DX AHUs and heated by perimeter finned tube radiators.
- DHW is provided by a gas-fired water heater located in the mechanical room of the new sanctuary.

Heating and Cooling System Replacement

A new condenser water system connected to the UTEN's UDS will serve as the centralized source for both heating and cooling across both sanctuaries.

- The preferred approach is to directly replace the existing air handling units AHU in both sanctuaries with water-source units that operate on the UTEN condenser water loop. This would preserve the existing ductwork and airflow distribution while eliminating on-site combustion.

- However, spatial constraints in the mechanical rooms of both the new and old sanctuaries may limit the feasibility of direct replacements. In such cases, alternative strategies will be considered:
    - A VRF system with thermostatic expansion valve (TXV) kits may be used, replacing only the evaporator coils with water-source VRF-compatible coils.
    - Alternatively, a full VRF system with multiple indoor units may be installed to serve the sanctuary areas, offering zoned control and flexible installation options.

These options will be evaluated based on available space, cost, and performance requirements.

Domestic Hot Water System

The existing gas-fired DHW heater will be replaced with a standalone ground-source heat pump water heater, paired with an auxiliary electric resistance storage tank. This system will ensure reliable hot water delivery for the church's needs while eliminating fossil fuel use.

Controls and Monitoring

The new HVAC and DHW systems will be controlled locally within the building. No centralized BAS is planned, and there will be no integration with the UTEN SCADA platform. This approach allows the church to maintain independent control of its internal systems while benefiting from the centralized thermal energy supply.

Greater Centennial Homes – (4-Building Multifamily Complex)

Centennial Homes is a four-building multifamily residential complex that will undergo a full mechanical system conversion as part of the Mount Vernon UTEN initiative. This retrofit will transition the complex from fossil fuel-based heating and DHW systems to a fully electrified thermal energy solution, improving energy efficiency, reducing emissions, and enhancing comfort for residents.

Existing Conditions

- Each apartment unit is currently heated by a hydronic baseboard system.
- Wall openings are provided for direct expansion (DX) air conditioning units, which are installed individually by residents.
- DHW is generated by dual natural gas-fired boilers located in basement mechanical rooms at the rear of each building.

Heating and Cooling System Replacement

A new condenser water system connected to the UTEN's UDS will serve as the centralized source for both heating and cooling.

- Each apartment will be heated and cooled by individual console units.
- The console unit systems are heating recovery system which will allow simultaneous heating and cooling, offering residents year-round thermal comfort.

Domestic Hot Water System

Domestic hot water will be provided by a shared standalone ground-source heat pump water heater system in each building. These systems will be paired with auxiliary electric resistance storage tanks to ensure adequate hot water supply during peak usage periods.

Controls and Monitoring

Each console unit system will be controlled locally within the apartment units. No centralized BAS is planned, and there will be no integration with the UTEN SCADA platform. This approach simplifies operations while maintaining flexibility and control at the unit level.

Residential Homes 1-4 Family

Two primary strategies were evaluated for space conditioning, depending on the existing infrastructure and layout of the home:

- **Strategy 1: Geothermal Heat Pump with Existing Ductwork**: For homes that already have ductwork, the existing forced-air heating equipment will be removed and replaced with a geothermal heat pump connected to the UTEN condenser water loop.
    - During the site audit, the ductwork will be inspected for condition and performance. Recommendations for air sealing, insulation, or modifications will be provided as needed.
    - If the ductwork is found to be inadequate or cannot be modified without significant disruption, Strategy 2 will be implemented.
- **Strategy 2: VRF System**: For homes without usable ductwork, a water-cooled VRF system will be installed.
    - Each electric meter will be served by a dedicated VRF system. For example, a two-family home will typically receive two separate systems unless otherwise requested by the owner.
    - Wall-mounted ductless indoor units will be installed in each room to provide zoned heating and cooling with minimal disruption to the home's interior.

All 26 residential buildings are designed as VRF heating and cooling systems. During a modified energy assessment, three energy efficiency measures were evaluated: air sealing, rim joist insulation, and attic insulation which would increase the R value to R-45. All 3 measures are recommended for 23 of the residential buildings; for 1 building only air sealing is recommended; for 2 buildings only air sealing and rim joists are recommended.

Domestic Hot Water Conversion Strategies

Three options were evaluated for electrifying DHW systems, based on the home's layout and heating strategy:

- **Strategy 1: Electric or Heat Pump Water Heater**: A standalone electric or air-source heat pump water heater will be installed to replace existing fossil fuel systems.
- **Strategy 2: Water-to-Water Geothermal Unit**: dedicated water-to-water geothermal unit with a double-wall vented heat exchanger will be installed to serve DHW needs.
- **Strategy 3: ClimateMaster Trilogy 45 Unit**: For homes using Strategy 1 for space conditioning (i.e., with ductwork), a ClimateMaster Trilogy 45 unit may be installed. This system is capable of providing 100% of the home's DHW in addition to space heating and cooling.

All 26 residential buildings are designed as water-to-water geothermal units stored in a DHW water tank fitted with an electrical heating element for supplemental heating.

Controls and Monitoring

All systems will be controlled locally within each home. No centralized BAS is planned, and there will be no integration with the UTEN SCADA platform. This approach ensures that homeowners retain full control over their systems while benefiting from the centralized thermal energy supply.

Electrical Upgrades

Electric upgrades will be installed to support the new electrified systems, and to ensure safe and reliable operation. Three new overhead services, 12 overhead primary spans, two overhead secondary spans, 19 poles, 16 overhead transformers, three pad-mount transformers, 33 underground services, and 280' of service conduit are required. For a summary of the required service and panel upgrades for all participating buildings refer to Table 8.

Table 8: Summary of Required Electric Upgrades

Building Name	Electric Service Upgrade (Y/N)	Electric Panel Upgrade (Y/N)
Fire Station	Yes	Yes
Doles Recreation Center	No	No
Medical Center	Yes	No
L.I.V.E. Church	Yes	Yes
Church of Sts John, Paul, & Clement	Yes	Yes
Macedonia Baptist Church	No	No
Greater Centennial Homes	All 4 Yes	All 4 No
Ebony Gardens	All 6 Yes	All 6 Yes
Residential Homes (1-4 Family)	All 26 Yes	25 of 26 Yes

System Operation/SCADA

To implement the Supervisory Control and Data Acquisition (SCADA) system for the UTEN in Mount Vernon, a qualified contractor will be retained in Stage 3 to deliver a comprehensive, cloud-based monitoring solution. Remote control functionality will be disabled since it conflicts with the Company's cybersecurity policies; instead, the contractor will provide a Remote Terminal Unit (RTU) at each customer location, bore field, and Energy Center to perform local control functions. Valves, pumps, meters, sensors, and other equipment will be connected to each RTU as applicable so the Utility Distribution System temperature can be controlled via local control logic, depending on the Pilot building loads and the UTEN operating mode (summer or winter). The RTU control logic will control the modulating valves across the Thermal Energy Resource and Customer ETS heat exchangers to control the Utility Distribution System temperature. SIM cards with LTE-enabled modem packages will be used to establish connectivity between the RTUs and the Company's cloud-based monitoring system via a private cellular network.

The cloud-based monitoring system will allow the Company to remotely monitor the UTEN's performance, receive alarms, and obtain the data needed to report all suggested technical metrics to the Commission during the 5-year Pilot operation period. The Company's metrics strategy is discussed further below in the "Metrics" section.

The qualified contractor's services will encompass the design, configuration, commissioning, and long-term support of a cloud-hosted SCADA system, tailored to meet the operational and data visibility needs of the UTEN infrastructure.

Scope of Work

The qualified SCADA contractor will be responsible for the following:

- **System Design and Engineering Services**: Includes architecture review, RTU control logic development, RTU and SCADA configuration, Human Machine Interface (HMI) development for local displays and the SCADA system, and documentation development.
- **Hardware Supply and Integration**:
    - **Energy Center**: One RTU with a full suite of Input and Outputs (I/O) cards, power distribution, a Universal Power Supply (UPS), and a local display.
    - **Bore Fields (4 total)**: Each site will receive an RTU with modular I/O, a power supply, a UPS, and a local display.
    - **Customer Sites (42 total)**: Each site will be equipped with a compact RTU, power supply, UPS, and local display.
    - All RTUs include LTE-enabled modems, SIM cards, antennas, and are housed in stainless steel enclosures with full wiring and mounting hardware.
- **SCADA Platform Deployment**: The cloud-native SCADA system will provide real-time monitoring, alarm management, data trending, and mobile/web access for authorized personnel. It includes LTE-enabled modems, SIM cards, and cellular antennas for secure connectivity.
- **Software Configuration**: Includes SCADA display development, alarm callouts (via text, email, or voice), and integration with third-party systems through APIs and database connections.
- **Testing and Commissioning**:
    - Factory Acceptance Testing (FAT) of RTU enclosures and communications.
    - On-site commissioning support for all RTUs.
- **Ongoing Support and Maintenance**:
    - 24/7 support for the SCADA platform.
    - Quarterly preventative maintenance and reporting.
    - Annual engineering service hours for system modifications, enhancements, or emergency support.
- **System Capabilities:** The SCADA system will:
    - Monitor field equipment across the Mount Vernon UTEN via a centralized cloud interface.
    - Provide alarm and event notifications to designated personnel.
    - Possess custom dashboards and analytics.

- Support seamless integration with enterprise systems.
- Maintain high system reliability.

- **Implementation Considerations**
  - The system will operate in a monitoring-only capacity, with polling rates optimized for cost and performance.
  - All RTU cabinets will be pre-wired, and final wire terminations will be provided by others.

This engagement will support the Mount Vernon UTEN deployment with a robust, scalable, and secure SCADA infrastructure, with expert engineering and technical support throughout the lifecycle of the Pilot. However, if the UTEN is expanded beyond the five-year pilot phase, the cloud-based monitoring system will be transitioned to a traditional, Company-hosted SCADA infrastructure. This transition is intended to further align with traditional utility SCADA systems and support long-term operational scalability and integration.

5.5. Possibilities for Expansion

Residential loads are generally small and consistent, which allows the Company the flexibility to incorporate a range of residential customers during the sign-up phase. In the event of network expansion, the Company can temporarily deploy air-source heat pumps to maintain service continuity while additional bore fields are constructed. Current assessments indicate that the Pilot could be extended to include all nearby buildings—excluding only Levister Towers and Grace House—through the addition of two more bore fields. The most strategic direction for expansion is toward the northeast, where several large municipally owned buildings are located. The City has expressed strong interest in clean energy solutions due to their associated health and community benefits, and Con Edison has developed term sheets with the municipal stakeholders to facilitate a streamlined expansion process. Furthermore, the Company has generated significant interest within the community, with residents from the greater Mount Vernon area expressing a desire to participate in the network.

5.6. Permitting

The Company has not yet applied for the permits required for the Pilot and will only do so once the Pilot is approved. A list of permits that the Company currently anticipates seeking if the Pilot moves forward can be found in the Appendix.

5.7. Energy Impact

The transition from fossil fuels to clean energy is not just a technological (equipment) shift, it is a fundamental shift in the way that energy is consumed. In an effort to understand the energy consumption shift from mostly fossil fuel systems to the proposed electrified alternatives, multiple energy modeling scenarios were simulated for residential and non-residential Pilot customers.

For 8 residential customer building, consumption by end-use was broken out by space cooling, space heating, water heating, cooking/gas appliances, and other energy consumption for:

- existing condition,
- existing condition weather normalized.

Energy modeling on the Trance Trace 3D Plus platform was developed to capture building envelop upgrades, conversion to UTEN equipment, and electrification of appliances. See Figure 12 for an illustrative example of all the residential energy modeling.

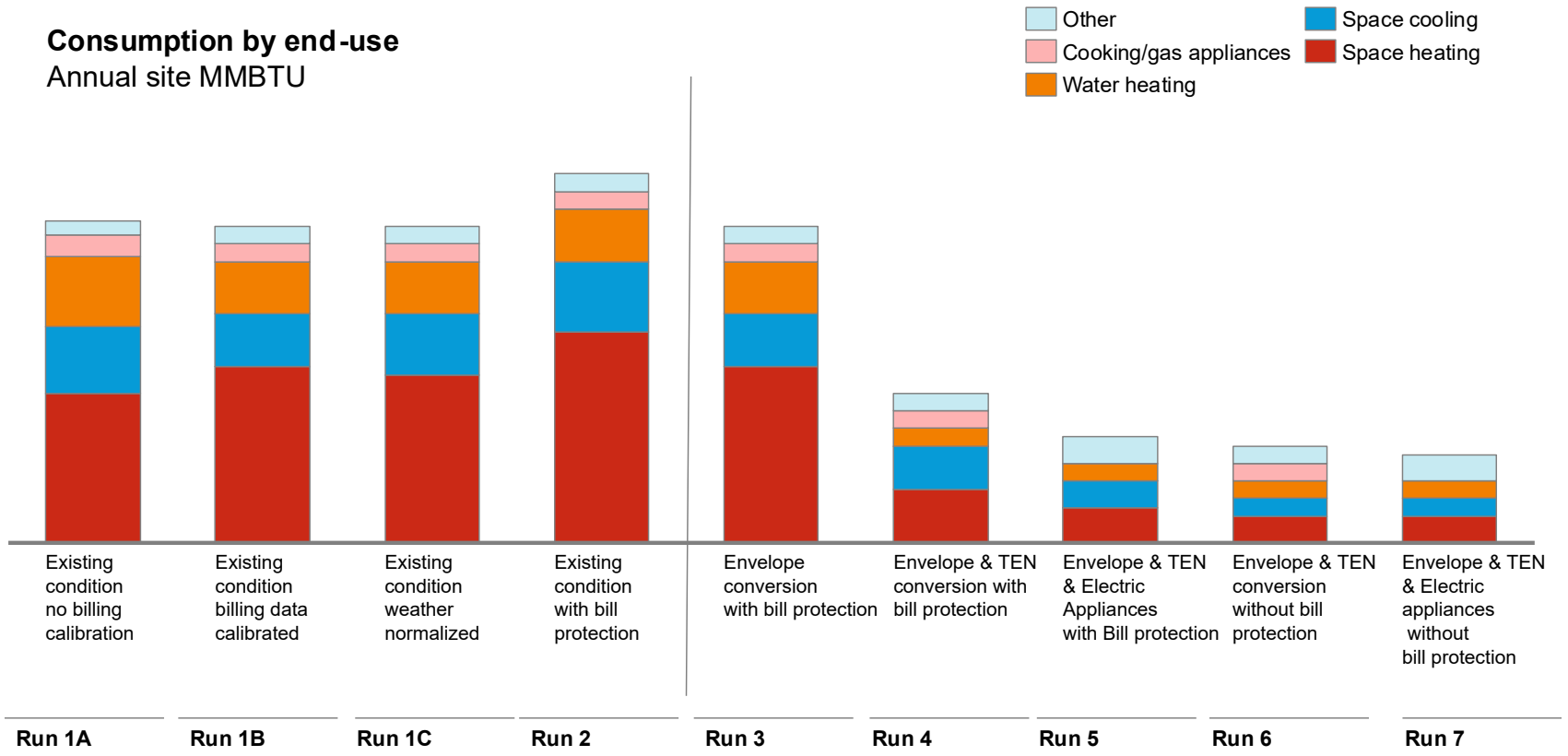

Figure 1212: Illustration of 1-4 Residential Building Energy Model Runs

The results from the eight modeled residential buildings were extrapolated for the remaining 18 residential buildings. Many of the residential buildings were found to be under-heated during the winter months. As a result, these buildings are not expected to achieve the same level of energy savings as those that have historically maintained sufficient heating.

Estimated[18] energy savings for these residential buildings is summarized in Table 9:

Table 9: Annual Estimated 1-4 Family Energy Use Pre- and During Pilot, Weather-Normalized MMBtu

	Electric	Gas	Oil
Pre-Pilot	616	3,154	562
During Pilot	1,693	83	0
Delta	**1,077**	**-3,071**	**-562**

For the 16 non-residential / multifamily buildings, consumption by end-use was broken out by space cooling, space heating, water heating, cooking/gas appliances, ventilation, and other energy consumption for:

- existing condition,
- existing condition weather normalized.

Energy modeling on the Trance Trace 3D Plus platform was developed to capture energy efficiency upgrades, conversion to UTEN equipment, and electrification of appliances. See Figure 13 for an illustrative example of all the non-residential energy modeling.

[18] Energy modeling results inherently have uncertainty. Further, these results may change based on the composition of targeted Thermal Customers who sign up to join the Pilot, the exact makes and models of equipment selected during Stage 3, and changes in the occupancy or uses of the various buildings.

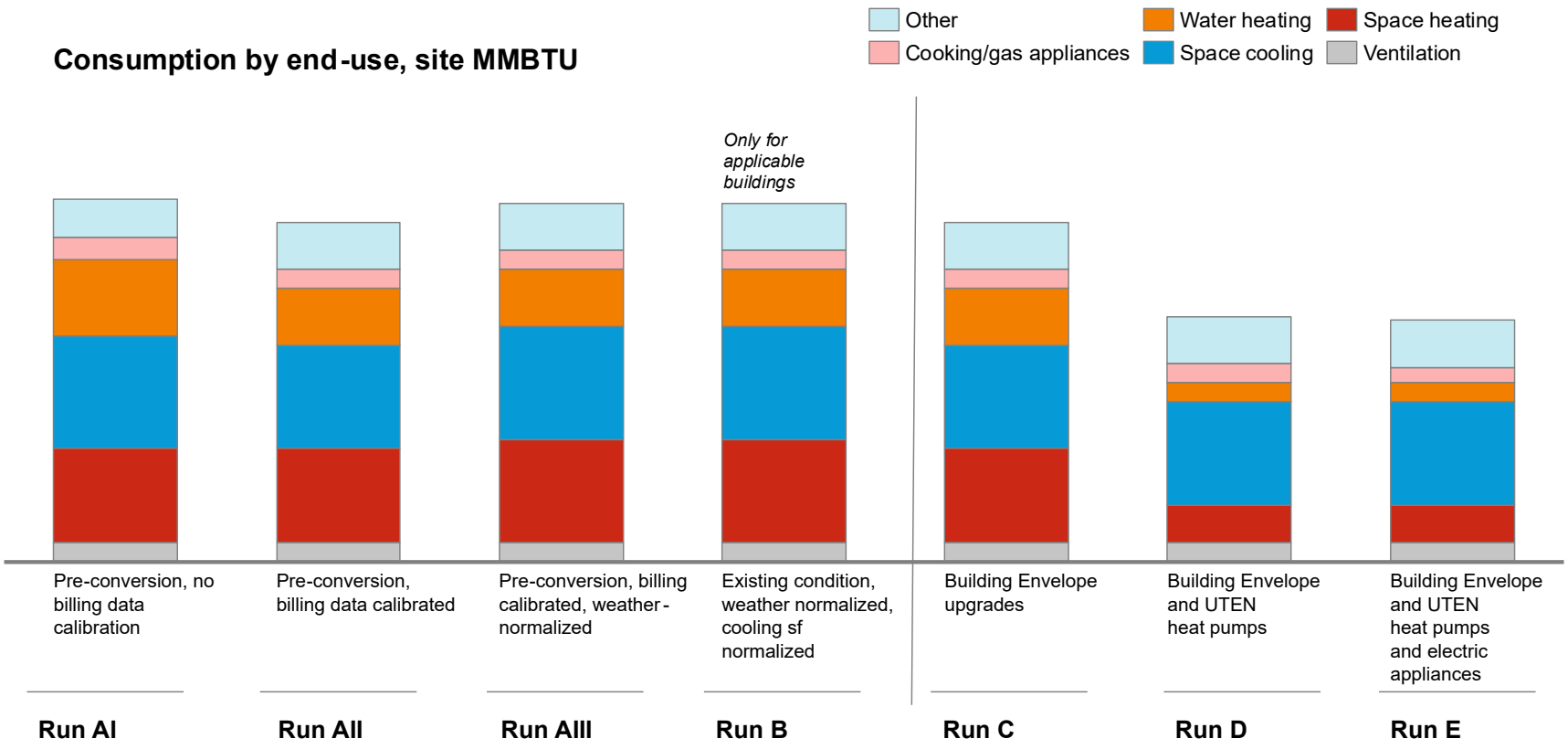

Figure 1313: Illustration of Non-Residential / Multi-family Buildings Energy Model Scenarios

Estimated energy savings for these non-residential / multifamily buildings is summarized in Table 10:

Table 10: Annual Estimated Non-Residential / Multifamily Family Energy Use Pre- and During Pilot, Weather-Normalized MMBtu

	Electric	Gas	Oil
Pre-Pilot	6,574	14,741	882
During Pilot	11,424	534	0
Delta	**4,850**	**-14,207**	**-882**

Overall Pilot level estimated energy consumption, factoring in the participating buildings and the UDS and Energy Center is below:

Table 11: Annual Estimated Total Energy Use Pre- and During Pilot, Weather-Normalized MMBtu

	Electric	Gas	Oil
Pre-Pilot	7,190	17,895	1,444
During Pilot (Customer Buildings)	13,117	617	0
During Pilot (UDS and Energy Center)	1,003		0
Delta	**6,930**	**-17,278**	**-1,444**

5.8. Minimum Customer Participation

To ensure the successful launch and operation of the Mount Vernon UTEN Pilot, a minimum threshold of customer commitment is required. Specifically, the Pilot will proceed to construction once customer agreements representing at least 35% of the total connected thermal load have been executed. This threshold guarantees that the system is adequately utilized from the outset and that the infrastructure investments are justified by committed demand.

Participation from at least two of the five largest connected customers is also required. These include the Mount Vernon Fire Station, Doles Recreation Center, Greater Centennial Church, Ebony Gardens, and the Medical Office Building. For example, the Doles Center, a multifamily complex, and a subset of the residential buildings would provide critical thermal load

and visibility, and their involvement is essential to demonstrating the network's technical and community value.

In addition, execution of land use agreements with the CMV for both the bore field sites and the Energy Center building is a required milestone prior to advancing to Stage 3b. These agreements enable the physical siting of core infrastructure and reflect a strong municipal partnership that supports the long-term success of the network. The Company has agreed on initial terms with the CMV.[19]

5.9. Design Learnings

The engineering design phase of the Mount Vernon UTEN Pilot yielded several key insights that will inform future thermal energy network (TEN) planning and implementation:

1) One-Pipe vs. Two-Pipe System

The Pilot initially considered a one-pipe ambient loop system but ultimately adopted a two-pipe configuration. This decision was driven by the need to ensure equitable thermal delivery across diverse building types and to simplify customer-side equipment design. The two-pipe system also enhances operational flexibility and reliability, especially in a mixed-use urban environment.

2) One-Loop vs. Two-Loop Utility Distribution System

Through the 60% design, the Pilot consisted of 2 hydronically separated UDSs, thermally connected inside the Energy Center building through heat exchangers. Both review firms recommended simplifying the design to a one-loop UDS. A simpler design would offer fewer variables to control leading to fewer potential operating challenges during the first couple of years of the Pilot. Two separate UDS loops would have offered more reliability: if one loop experienced a damage, the other loop would have been completely unaffected. However, the bore field sizes varied greatly between the two loops: in order to ensure thermal balance greater data analysis and thermal balancing complexity would have been required. Designing the Pilot to start with one loop allows for a smoother Pilot commencement and operational knowledge buildup to add a second loop, heading in the northeast direction toward large municipally owned building, in the future. The recommendation was adopted, and the Pilot was redesigned into a one-loop system.

3) Hybrid System Optimization

The integration of ASHPs for shoulder season operation proved to be a valuable strategy. This hybrid approach reduces the required bore field capacity, thereby lowering capital costs

[19] See Appendix.

while maintaining thermal balance. It also provides operational redundancy during peak demand, maintenance events, or unplanned bore field outages.

4) Propylene Glycol Management

The use of a 25% propylene glycol solution as the heat transfer medium was selected after careful consideration of environmental, safety, and performance factors. Coordination with Environmental Health & Safety (EH&S) and compliance with DEC requirements ensured that the system design met regulatory standards while optimizing thermal performance.

5) Data Collection and SCADA Integration

The need for granular, real-time data collection was greater than initially anticipated. To meet PSC performance metric requirements, a full SCADA system was incorporated into the design, including hourly British Thermal Unit (BTU) metering at each customer site. This added complexity and cost but is essential for monitoring, control, and future scalability.

6) Customer Conversion Cost Estimation

Initial high-level estimates underestimated the cost of customer conversions, particularly for larger or more complex buildings. Detailed site assessments during Stage 2 enabled more accurate budgeting and highlighted the importance of early engagement with building owners to understand retrofit needs.

7) Energy Center Design Evolution

The Energy Center was originally envisioned as a repurposed structure but evolved into a new, purpose-built facility. This change was necessary to accommodate equipment, SCADA infrastructure, and office space for the CMV. The shift increased costs but improved long-term functionality and community integration.

8) Load Modeling and Bore Field Sizing

Thermal load modeling using TRACE 3D Plus and ASHRAE standards provided critical insights into peak and annual energy demands. The 20-year bore field prediction model allowed for a cost-conscious design that supports long-term thermal balance and system resilience.

9) Early Involvement with Utility Information Technology Subject Matter Experts about UTEN Monitoring and Controls Strategy

The Company learned that engaging in early conversations with the leadership of its other commodities (e.g., natural gas and steam) is critical to determine the strategy that will be used to monitor and control a UTEN. Since other commodities' SCADA systems are highly regulated, they were unable to incorporate the Pilot's data into the Company's existing SCADA systems. It took time to complete this assessment and come to this decision, which delayed engagement with a potential control system integrator to obtain potential new SCADA solutions that could be used to

monitor the UTEN. Due to cost considerations, the expected Pilot construction schedule, ease of maintenance, and unknown long-term future of the UTEN ownership, the recommended monitoring and controls strategy was a cloud-based solution. The cascading delay of receiving this information resulted in delayed engagement with the Company's Information Technology subject matter experts about the cybersecurity risks a cloud-based SCADA system could pose to the Company. The Information Technology subject matter experts ultimately agreed with the cloud-based monitoring strategy for the UTEN, but remote-control functions were disabled. Being unable to remotely control the UTEN then impacted design by necessitating local control panels with RTUs to operate the UTEN. All control changes or manual operations will be required to be performed at each location. The longer than expected timeframe to work through a series of important but interconnected issues to determine the monitoring and control strategy for the UTEN resulted in receiving a cost estimate for SCADA implementation several months later than originally anticipated.

6. CUSTOMER OUTREACH & ENGAGEMENT

The Company places a high priority on community engagement as a key component of UTEN deployment, recognizing the importance of proactively understanding the needs and priorities of customers, residents, tenants, and affected communities. Customers needed to understand the Pilot to decide whether or not to participate in the Pilot. This often-required in-depth conversations with each customer. Due to the high volume of 1–4 family homes within the Pilot area, a multifaceted communication strategy was necessary. These households often lacked the centralized property management or technical staff typically found in larger buildings, which meant that outreach efforts needed to be more individualized. Many homeowners were unfamiliar with thermal energy networks, requiring tailored educational efforts to ensure they could make informed decisions about participation. As a result, the Company employed a range of outreach methods to effectively engage and inform this diverse residential audience.

During Stage 2, the Company continued to build relationships with Pilot participants, including local building owners, churches, residents, and the City of Mount Vernon. To gain participation, the Company partnered with internal departments such as the Energy Efficiency and Clean Heat teams and Customer Operations Outreach & Education, the Director of Sustainability from the CMV, and the design contractors, ZBF Geothermal and CDM Smith, for canvassing outreach to schedule and complete energy assessments.

The Company spent $50,000 for outreach related to the Mount Vernon Pilot, which included funding for in-person engagement and outreach materials to enhance access to Pilot offerings and Pilot information. Additionally, the Company designated one full time employee (FTE) to liaise between the Pilot participants and Con Edison, and work cross-functionally with other internal Con Edison teams, such as Marketing and Regional and Community Affairs, to develop and implement the targeted customer engagement strategy.

6.1. Community Engagement Plan

During Stage 2, the Mount Vernon UTEN team prioritized deep, sustained engagement with the community to build trust, raise awareness, and secure participation in the Pilot. Recognizing the diversity of building types and the importance of reaching both homeowners and institutional stakeholders, the team implemented a multi-channel outreach strategy that included:

- **Direct Canvassing**: Biweekly door-to-door outreach from July 2024 through February 2025, including evenings and weekends, to maximize resident availability. Outreach teams wore Con Edison-branded apparel and used marked vehicles to build trust and credibility.

- **Energy Assessments**: Partnered with internal departments and design contractors (ZBF Geothermal and CDM Smith) to schedule and complete energy assessments for over 40 buildings, including homes, churches, and municipal facilities.
- **Community Events**: Hosted and participated in local events, including a Town Hall at the Doles Recreation Center and multiple CMV events, to provide information and answer questions.
- **City Council Engagement**: Delivered frequent formal presentations to the Mount Vernon City Council to provide updates, answer questions and gather feedback.
- **Educational Materials**: Distributed handouts, door hangers, and brochures on energy safety, energy efficiency, and financial assistance programs. Personalized letters, postcards and emails were sent to residents highlighting the benefits of participation, including no-cost equipment upgrades and bill protections. Residents received a free energy efficiency kit that included LED lightbulbs and weatherization tools after the assessment. A news article and podcast highlighting thermal energy network projects were shared on the company's website and social media such as Facebook, X, Instagram and LinkedIn.
- **Customer Support**: Designated a full-time liaison to coordinate between Con Edison and community stakeholders and collaborated with internal teams such as Marketing and Regional and Community Affairs to tailor messaging and outreach. A dedicated hotline with trained Customer Service Representatives (CSRs) was created to assist customers who had questions about the Pilot and schedule energy assessment appointments.
- **Customer Journey Map:** A customer journey map is a process improvement method that delves into the entirety of a customer's experience when interacting with a company, rather than focusing solely on individual interactions or transactions, known as customer touchpoints. This comprehensive approach, referred to as a "journey," encompasses the entire process from the moment a customer initiates a transaction to its completion, ensuring that all their needs and expectations are met. The UTEN project team completed a journey-mapping exercise to understand the customers' journey through the Pilot before pain points arise. This approach was also crucial while working on awareness and outreach plans. For a detailed view of the journey map, please refer to the Appendix.
- **Building Conversion Profiles:** A personalized overview of the current conditions and proposed building envelope improvements for each building to connect to the UTEN.
- **Letters of Interest**: A nonbinding letter of interest was emailed to Mount Vernon residents throughout May and June 2025, while in-person customers received a hard copy on Con

Edison's proposal for a UTEN in the area, highlighting benefits such as free equipment and bill protection.

The team also addressed common concerns, such as skepticism about the Pilot's legitimacy and fears of increased energy bills after the pilot period. These were mitigated through direct access via phone and email to the UTEN team, transparent communication, clear explanations of customer protections, and visible community presence. As the Pilot transitions into Stages 3 and 4, the team will continue to prioritize proactive, transparent, and inclusive engagement as needed. The plan includes:

- **Ongoing Communication**:
    - Regular updates through in-person community meetings, virtual information sessions, and personalized emails and correspondence.
    - Bill messaging and inserts, door hangers, and postcards to communicate construction timelines, equipment installation details, and customer responsibilities.
- **Educational Campaigns**:
    - Infographics and videos explaining the UTEN system and customer equipment.
    - A dedicated website (coned.com/MtVernonTEN) and QR codes on all materials for easy access to information.
    - Construction signage and building posts to keep the community informed during implementation.
- **Customer Support**:
    - A dedicated hotline staffed by trained CSRs.
    - On-site outreach teams to assist with scheduling, answer questions, and provide updates.
    - Community forums to continuously improve engagement.
- **Targeted Outreach and Events**:
    - Workforce development workshops in partnership with the CMV.
    - Local events and forums to maintain visibility and build relationships.
    - Coordination with nonprofit agencies and community groups to reach vulnerable populations.
- **Customer Metrics**
    - The UTEN Pilot aims to enhance customer satisfaction, education, and awareness through a comprehensive survey strategy to gather valuable feedback, measure key performance metrics, and ensure that customers are well-informed and

satisfied with the UTEN service. Targeted surveys and proactive engagement efforts will involve regular monitoring and reporting to ensure compliance with regulatory requirements and continuous improvement. Key metrics will be tracked, and feedback loops will be established to refine survey design and outreach strategies based on customer feedback.

This comprehensive engagement strategy ensures that residents and stakeholders remain informed, supported, and empowered throughout the construction and operational phases of the pilot. The team's commitment to accessibility, transparency, and responsiveness will continue to be a cornerstone of the Pilot's success.

6.2. Marketing Strategy and Execution

During Stage 2, the Mount Vernon UTEN team implemented a targeted marketing campaign to raise awareness and drive participation. The strategy focused on clear, accessible messaging and direct engagement with residents. Key tactics included personalized letters and emails, door hangers, postcards, and outbound calls from Con Edison's Customer Experience Center. These efforts were supported by branded outreach teams, educational brochures, and a gift card incentive program that helped increase energy assessment sign-ups. All materials emphasized the no-cost benefits of participation, bill protections, and improved comfort, helping to build trust and overcome skepticism in the community.

In Stages 3 and 4, marketing will focus on keeping customers informed and engaged throughout construction and system activation. The team will use a mix of mailers, digital content, signage, and community events to communicate timelines, equipment installation updates, and customer responsibilities. A dedicated website, QR codes, and a customer hotline will provide ongoing support, while surveys and feedback loops will help refine messaging and ensure a positive customer experience.

6.3. Stakeholder Partnerships

Throughout Stage 2, the Mount Vernon UTEN team built and maintained strong partnerships with a wide range of stakeholders to ensure the pilot was designed with community needs, equity, and long-term success in mind. These partnerships were essential to securing participation, aligning with city priorities, and preparing for future construction and operations.
Key stakeholder partnerships included:

- **City of Mount Vernon**: The City was a foundational partner in the Pilot. The team held bi-weekly coordination meetings with city officials, including the Director of Sustainability and Director of Business Development, and delivered seven formal presentations to the City Council. These efforts helped secure preliminary support for land use agreements, including siting the Energy Center Building and drilling bore fields on city-owned property.
- **Community Institutions**: The team worked closely with local churches, the Westchester Community Health Center in Mount Vernon, the Doles Recreation Center, and the Fire Department to assess building needs and coordinate energy assessments. These institutions serve as anchor participants in the pilot and are vital to community trust and visibility.
- **Environmental Advocacy Organizations**: The team engaged with several key advocacy groups to ensure the pilot reflected the priorities of climate justice and equitable energy access. These included:
    - **Building Decarbonization Coalition**: Provided input on policy alignment and community engagement best practices.
    - **New York League of Conservation Voters (NYLCV):** A statewide environmental organization in New York that fights for clean water, clean air, renewable energy and open space through political action.
    - **SANE Energy Project**: Offered guidance on community-centered energy planning and helped amplify outreach efforts.
    - **Alliance for a Green Economy (AGREE)**: Contributed feedback on customer protections, affordability, and long-term sustainability of the thermal network.
    - **Upgrade NY**: A coalition of labor, environmental, and housing advocates that supported the Pilot's goals of equitable decarbonization and workforce development. Upgrade NY participated in the November 2024 Town Hall at the Doles Recreation Center and helped connect the project team with local partners and union representatives.
- **Labor and Workforce Organizations**: The team engaged with the New York State Building and Construction Trades Council (NYSBCTC) and UWUA Local 1-2 to support internal workforce development. These partnerships will ensure that all skilled trade work is performed by union labor and that local workers are trained and prepared for UTEN-related roles

As the Pilot transitions into construction and operation, stakeholder partnerships will remain central to its success. The team will:

1. Finalize land use agreements with the CMV for the Energy Center and bore field easements.
2. Maintain regular coordination with city departments to align construction timelines with other municipal projects and minimize community disruption.
3. Continue working with stakeholders to schedule equipment installations, provide updates, and gather feedback.
4. Deepen collaboration with Environmental Justice organizations and Upgrade NY to ensure ongoing accountability, affordability, transparency, and alignment with climate equity goals.
5. Expand partnerships with local workforce development organizations to recruit and train workers for UTEN construction and maintenance.
6. Sustain internal coordination across Con Edison departments to manage customer enrollment, billing, communications, and regulatory reporting.

These partnerships will ensure that the Mount Vernon UTEN pilot is delivered efficiently, equitably, and in alignment with community needs and state climate goals.

6.4. Challenges

Community engagement is not just a component of the Mount Vernon UTEN Pilot— it is the foundation upon which the entire initiative rests. The success of this Pilot depends entirely on the willingness of residents to participate, open their homes, and embrace new technologies. Without community trust and involvement, the Pilot would not be viable. This section outlines the key challenges Con Edison encountered in building that trust and securing participation, as well as the comprehensive strategies the Company implemented to overcome those barriers and foster meaningful engagement.

- **Challenge #1: Initial Community Skepticism**

  Community members initially expressed skepticism toward Con Edison, perceiving the Pilot as potentially fraudulent. The offer of free HVAC system upgrades appeared and doubtful to some, leading to concerns even after energy assessments were scheduled. Being able to answer questions about Con Ed programs, accounts and billing, along with the use of Con Edison-branded apparel and vehicle signage, helped alleviate these concerns. Additionally, there was limited understanding of geothermal borehole technology among residents.

Others did not understand geothermal borehole technology. To address these concerns, the Company implemented a multi-faceted outreach strategy which included, but not limited to:

- Personalized, multilingual communication (letters, emails, phone calls, hotline, door hangers)
- Mailed materials highlighting Pilot benefits, energy assessment scheduling, and the UTEN team's contact information
- Biweekly canvassing from July 2024 through February 2025
- Door hangers about the Pilot and encourage an energy assessment
- Town halls and community events (detailed in the Stakeholder Partnerships section)
- Trained CSRs for the UTEN Skills Group, a dedicated hotline for customers to get information and ask questions.
- In addition to providing information about the Pilot, the Company continued to educate customers about other available programs and kept them informed of energy safety tips, energy efficiency programs, payment agreement options, financial resources, updates on energy costs, EAP enrollment, and self-service options available online through My Account.

- **Challenge #2: Scheduling Energy Assessments**

  Securing participation in energy assessments proved to be a significant hurdle, particularly among individual residents. While larger entities with professional building management were generally more responsive, many residents were hesitant to engage. The request to allow contractors into their homes for extended periods was understandably perceived as intrusive. Additionally, some residents expressed the concern that Con Edison representatives were visiting to collect overdue bills, further complicating outreach efforts. These barriers underscored the need for thoughtful, creative, and trust-building strategies tailored to individual households.

  - **Gift Cards:** The UTEN team initially sent out letters in June 2024 to encourage sign-ups but faced difficulties. To incentivize positive customer behavior, gift cards were offered to residents who completed the energy assessment. While this strategy attracted some participants, it was insufficient. Consequently, in November 2024, the team increased the gift card amount from $50 to $200, resulting in a higher level of customer participation with 67 gift cards distributed after residential energy assessments were completed.

- **Assisting Customers in Arrears:** The UTEN team's sole mission when canvassing was to provide outreach and education on the Mount Vernon Pilot, not to collect overdue bills. Still, this perception created a trust gap that required deliberate and sensitive intervention. To address this, the Company created a UTEN Arrears Taskforce to contact customers eligible for disconnection for nonpayment, assisting customers in arrears. This team made outbound calls to provide payment options and provide financial assistance program information. This prompted bill payments from nearly half of the customers in arrears in the Mount Vernon Pilot.
- In addition to the initiatives above, the Company continued to send outreach collateral listed under Challenge #1.

- **Challenge #3: Barriers to Pilot Participation**

  Even after residents completed energy assessments, a number of structural, logistical, and perceptual barriers prevented them from enrolling in the UTEN Pilot. These challenges highlighted the complexity of converting initial interest into full participation, particularly in communities with diverse housing arrangements and varying levels of trust in new technologies.

  Several key factors contributed to this drop-off:

  - **Health and Safety Violations:** Some buildings had outstanding health code violations that disqualified them from participation.
  - **Tenant-Landlord Uncertainty:** Many tenants were unsure whether they had the authority to approve HVAC upgrades without explicit permission from their landlords.
  - **Coordination with Property Managers:** Scheduling access with management companies proved difficult, especially in multi-unit residential buildings and places of worship.
  - **Absentee Landlords:** In many cases, property owners did not reside on-site, making communication and decision-making more complex.
  - **Tenant Hesitancy:** Some tenants were uncomfortable proceeding without their landlord's knowledge or approval.
  - **Concerns About Appliances:** Residents expressed reluctance to give up gas stoves or dryers, even when informed of the benefits of electrification.
  - **Recent HVAC Investments:** Some building owners had recently upgraded their systems and were not interested in further changes, despite the long-term advantages of UTEN.

- **Technology Aversion:** A general reluctance to adopt unfamiliar technology persisted, with some residents fearing that their energy bills might increase—even after receiving assurances about bill protection, no-cost equipment upgrades, and the overall benefits of the program.

6.5. Customer Outreach Learnings

1) Trust-Building

Many residents were initially skeptical of the Pilot, especially the offer of free HVAC upgrades, which seemed too good to be true. Con Edison-branded uniforms, vehicle signage, and consistent messaging helped establish credibility.

2) Personalized Communication

Outreach efforts had to be multilingual and tailored to individual households, using letters, phone calls, emails, door hangers, and a dedicated hotline to ensure residents received and understood the information.

3) Incentivizing Participation

The initial $50 gift card offered for completing energy assessments had limited impact, but increasing the amount to $200 led to a noticeable rise in engagement.

4) Clarifying Outreach Intent

Some residents feared that Con Edison representatives were visiting to collect overdue bills. A dedicated UTEN Arrears Taskforce helped clarify the purpose of outreach and provided support for customers in arrears.

5) Limitations for Participation

Even after initial interest, issues like health code violations, absentee landlords, and tenant-landlord uncertainty prevented some residents from participating in the pilot.

6) Technology Resistance

Despite assurances about cost savings and no-cost equipment upgrades, some residents were reluctant to adopt new systems due to concerns about losing gas appliances or increasing energy bills.

7) Importance of Community Partnerships

Collaborations with the CMV, community organizations, and advocacy groups helped raise awareness and build trust.

8) Visibility

Signage at parks, lawn signs after assessments, in-person presence at local events and a dedicated Pilot website helped reinforce the Pilot's credibility and accessibility.

9) Ongoing Engagement

Continued outreach through community meetings, digital platforms, correspondence, onsite support and partnerships in the Pilot area will be essential to sustaining momentum into Stage 3.

7. LABOR AND WORKFORCE DEVELOPMENT

The following labor and workforce development approach applies across all three pilot projects in Con Edison's Utility Thermal Energy Network (UTEN) portfolio. While this section is embedded within this filing, the strategies, commitments, and structures described herein—including union labor agreements, workforce training, and contractor engagement—are consistent across the Chelsea, Mount Vernon, and Rockefeller Center Pilots. This unified approach ensures alignment with the Utility Thermal Energy Network and Jobs Act and supports a scalable, equitable transition to clean thermal energy infrastructure.

7.1. Third Party Contractors

The Company will engage third-party contractors to perform work on the construction phase of the Pilot, which includes both customer-sided equipment and Company-owned UTEN infrastructure (the "construction phase"). Customer-sided work includes, but is not limited to, the installation of water-source heat pumps, fan coil units, DHW systems, heat exchangers, and associated electrical and plumbing upgrades within residential and commercial buildings to enable connection to the UTEN. Company-owned UTEN infrastructure work encompasses the installation of distribution piping—which may be located underground, within buildings, or routed through other passageways—as well as excavation, backfilling, street restoration, bore field drilling and development, and the construction and outfitting of Energy Centers. These Energy Centers will house UDS pumps, ETSs, heat exchangers, SCADA-integrated control systems, and other critical infrastructure necessary for UTEN operation.

The Company intends to use a PLA for the construction phase of the Pilot and otherwise comply with the requirements of the Utility Thermal Energy Networks and Jobs Act (UTENJA). 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 period, the Company will follow all applicable labor requirements set forth in the UTENJA. To the extent that third-party contractors are engaged to perform maintenance and operation work, the Company will require the third-party contractors to adopt and abide by the terms of a Labor Peace agreement and to satisfy applicable hiring requirements in compliance with the UTENJA.

7.2. Company Workforce

The Company has existing collective bargaining relationships with UWUA Local 1-2 (the "Union") for its existing operations and maintenance work. Should the Company decide to self-

perform the operation and maintenance of a covered UTEN Pilot following the initial pilot period, the Company will satisfy the UTENJA's hiring requirements, drawing first from employees who have lost, or are at risk of losing, their employment with a utility downsizing its gas transmission and distribution system provided to the Company by the Department of Labor. The Company will negotiate and enter into a Labor Peace agreement with UWUA Local 1-2 or otherwise recognize and negotiate with the Union in a manner that meets the requirements of the UTENJA and applicable law.

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 Utility Thermal Energy Networks and Jobs Act. This effort will proceed across three stages: 1) Workforce Development Plan; 2) Training and Implementation; and 3) Workforce Integration.

1. Workforce Development Plan
    - Establishing the Emerging Technology Committee
        - The Company will first establish an Emerging Technology Committee (ETC), consisting of key internal stakeholders from across the Company. The mission of the ETC will be to develop a Company workforce plan that will implement the requirements of the UTEN law through the construction and O&M phases. The ETC will consist of key stakeholders from Company organizations such as Gas Operations, Gas Engineering, Human Resources, Union Labor Representatives, and the Learning Center. The ETC will review and provide guidance on all components necessary to integrate and transition existing Company employees and displaced gas utility workers identified pursuant to the UTENJA to perform UTEN operation and maintenance functions following the expiration of the pilot period, including determining the right skill sets required, the number of individuals needed for each job category; content and schedule of training programs; and identifying other areas of the organization will be part of the mix of staffing for the Pilots.
    - Workforce Needs and Available Talent
        - The ETC will focus first on understanding all aspects of the nature and scope of the work related to operating and maintaining covered networks providing thermal energy for heating and cooling. This clarification of work objectives is intended to aid in the development of an outline of the duties and tasks associated with the operating and maintenance needs of the networks and to

provide insights into the number and types of roles needed to meet the needs of these networks.

- The ETC will identify and recommend available talent within the Company to staff covered Pilots. Based on the similarities of the infrastructure piping used for thermal energy networks and Con Edison's natural gas system, we expect that existing gas personnel within Con Edison will play a role in staffing the UTEN facilities after the expiration of the pilot period. 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, and therefore quicken 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 UTEN pilot Pilots, including employees in Customer Operations, EH&S, Construction, Call Center, the Learning Center, and the Control Centers. Con Edison will engage with union representatives to facilitate opportunities for current gas operations employees.

- Skills Assessment and Identifying Gaps
  - A skills assessment will be a necessary part of the Company workforce planning process to properly match current employees against the specific knowledge and skill requirements of UTEN. In addition to complying with any requirements to first hire from a list of employees provided to the Company by the New York State Department of Labor, pursuant to the UTENJA, the ETC will identify candidates with the right knowledge and talents for the Pilot after conducting this skills assessment.
  - To staff the workforce needed to successfully operate and maintain these networks with a sufficient number of people and with the right skills and experience, the ETC must also address skill gaps. After undertaking a skills inventory, the ETC will best understand what skill gaps exists within the Company and will create a training and development plan to close those gaps. The role of the ETC will entail creating an outline of training activities to raise the levels of skills required for maintenance and operation of the UTEN network following the completion of the pilot period.

2. Training and Implementation

- The ETC, working closely with the Con Edison Learning Center, will create a 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, such as 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 new UTEN systems. 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 projects. In addition, all other functions outside of operations will be trained and prepared to supplement the needs of the UTEN pilot projects. These include but are not limited to the Billing Department, Call Center Representatives, Energy Services, and the Learning Center.

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

7.3. Small Business Plan

Supplier Enablement, Engagement and Development (SEED)

Engagement Policies and Initiatives

- Long-Standing Commitment to Small and Local Businesses: For over 45 years, Con Edison has actively built relationships with small and local businesses, including veteran-owned, disabled-owned, HUB Zone, and local enterprises, believing that diverse suppliers promote competition, spark innovation, and reduce costs.

- SEED Program: A dedicated program to increase small and local business participation in procurement, with clear onboarding processes and support resources.
- Contact Information: Small business vendors are encouraged to reach out via 1-212-460-3076 or SEEDprogram@coned.com.
- Significant Spending: Over the past decade, Con Edison has spent more than $2.5 billion with small and local businesses. In 2023 alone, 31% of in-state contracts were awarded to these businesses.
- Certification and Registration: Con Edison aligns its consideration of small businesses, i.e. criteria, size standards, and revenue with the U.S. Small Business Administration (SBA). This enables our suppliers and the company to engage with businesses from a variety of small business classifications including those described above.
- Outreach and Training: Includes partnerships with the Regional Alliance for Small Contractors, along with various city and state agencies.
- Internal Advocacy: Leaders within Con Edison champion diversity and inclusion and serve on advisory boards and task forces.
- Unbundling Contracts: Large contracts may be broken into smaller components to allow small businesses to bid competitively.

Application to the UTEN Pilot (Stage 3 and Beyond)

- **Engagement:**
  - Actively seek small and local vendors for procurement.
  - Conduct targeted outreach and provide training on Pilot requirements.
  - Track and report small and local business participation throughout the Pilot lifecycle.
- **Local Workforce Engagement:**
  - Prioritize hiring local workers for construction, installation, and maintenance.
  - Seek out specialized training to ensure readiness for UTEN-specific roles.
  - Partner with local trade groups and nonprofits to promote job opportunities.
- **Organized Labor:**
  - The Company will strive to ensure that all skilled trade work will be completed by union labor.
  - A Labor Peace Agreement will be pursued with UWUA Local 1-2.

- A PLA will be pursued for construction.

As part of its commitment to a just and equitable energy transition under the UTENJA, the Company convened a strategic meeting with key labor leaders from the NYSBCTC. This meeting included collaboration with the Building and Construction Trades Council of Greater New York and focused on the execution of the Mount Vernon UTEN Pilot.

This meeting served as an important opportunity to align the Company's labor strategy for the Mount Vernon Pilot, particularly in relation to geothermal borehole drilling and the broader construction scope. The Company reaffirmed its intent to pursue a PLA for the construction phase of the pilot, ensuring that all skilled trade work—including the specialized drilling of deep geothermal boreholes—will be performed by a union workforce. The Company also emphasized its broader workforce development goals, including the integration of union labor into long-term UTEN operations and maintenance. This includes training and upskilling workers in geothermal technologies, bore field installation, and thermal energy system management. The Company will continue to coordinate closely with the NYSBCTC and its affiliates throughout the life of the Mount Vernon Pilot. This collaboration will help ensure that labor standards are upheld, workforce opportunities are equitably distributed, and the Pilot serves as a model for labor-inclusive clean energy infrastructure development in New York State.

7.4. Project Management Team

The Company has a dedicated UTEN project team overseeing the development, design, construction, and operation of the Pilot. The dedicated team members will specialize in specific areas, such as finance, engineering, project management, customer outreach, customer protections, awareness 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 and workforce development training. In addition to this team, other departments within the Company will provide support in various areas of expertise, including but not limited to: Legal, Strategic Engagement, Customer Operations, Finance, Environmental Health and Safety, Rate Engineering, Billing, Procurement, and Gas Operations.

The Mount Vernon Pilot will require a dedicated team to ensure the successful construction, commissioning and initial operation of the thermal energy network. Below is the proposed incremental team that would be needed, assuming only the Mount Vernon Pilot is approved beyond Stage 2. During Stages 1 and 2, CECONY was developing three Pilot projects

simultaneously, which required a total incremental FTE count of 8. In the event that only the Mount Vernon Pilot is approved for Stage 3, the execution of the construction of the Pilot will not require additional FTEs. In the event multiple CECONY pilot projects are approved for Stage 3 simultaneously, additional FTEs will only be needed to incorporate portions of the Pilot that do not have synergistic relationships.

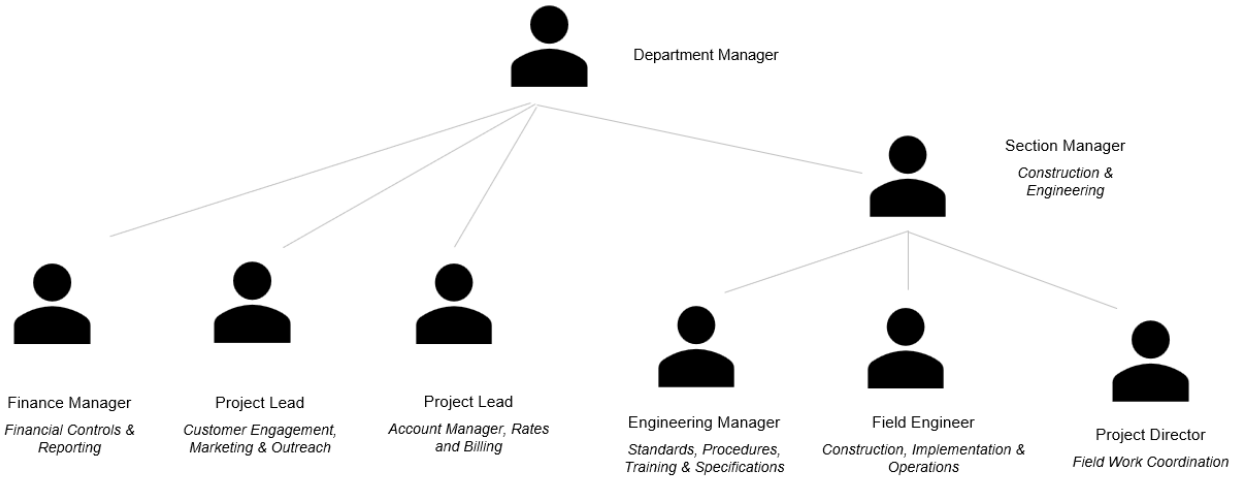

Figure 14: Example of Con Edison's UTEN Team

The Company will procure an outside project management company for the direction project management, vendor management and metrics tracking associated with Stage 3 of this Pilot. That third party PMO vendor 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.

Below is a breakdown of the major functions of each incremental FTE:

Department Manager: Responsible for the strategic oversight and coordination of all UTEN workstreams across the full portfolio of approved Pilots. This includes leading the development and refinement of the overarching UTEN business case, ensuring alignment with long-term organizational goals, and identifying opportunities to expand the pilots or develop additional high-impact Pilots. The Department Manager ensures cross-functional collaboration, drives performance metrics, and provides executive-level reporting on progress, risks, and outcomes.

Section Manager: Leads and manages all engineering and construction activities associated with the Pilot, ensuring that all phases of the Pilot are executed efficiently,

safely, and in compliance with applicable codes and standards. This includes overseeing design implementation, construction progress, contractor coordination, and quality assurance. In addition to core responsibilities, the Section Manager will:

- Oversee and work directly with the project management vendor, ensuring alignment on Pilot timelines, deliverables, and reporting.
- Coordinate with engineering teams, field personnel, and external consultants to resolve technical challenges and maintain project momentum.
- Monitor construction schedules, budgets, and resource allocation to ensure timely and cost-effective delivery.
- Serve as the primary point of contact for construction-related matters, providing regular updates to senior leadership and stakeholders.

Field Engineer: Provides direct, on-the-ground engineering support and technical oversight throughout all phases of the Pilot, including construction, commissioning, and operational transition. This role ensures that all work is executed in accordance with design specifications, safety standards, and Pilot timelines. In addition to core responsibilities, the Field Engineer will:

- Oversee the system commissioning vendor, ensuring all systems are tested, validated, and meet performance criteria.
- Supervise the engineer of record responsible for construction oversight, ensuring alignment with approved designs and regulatory requirements.
- Prepare and maintain as-built documentation, capturing all field modifications and final configurations.
- Sign off on final construction drawings and commissioning documents, certifying that the Pilot meets all engineering and compliance standards.
- Engage directly with all relevant regulatory agencies, managing all design and environmental filings, and ensuring full compliance with local, state, and federal requirements.

This role is critical in bridging design intent with field execution, ensuring a seamless transition from construction to operation.

Project Director: The Project Director will serve as the lead authority overseeing all construction and implementation activities for the Mount Vernon UTEN Pilot. This role is responsible for ensuring that all utility-owned infrastructure, customer-side installations, and stakeholder coordination efforts are executed efficiently, safely, and in alignment with Pilot goals and regulatory requirements.

- **Construction Oversight:** Direct and manage the full scope of construction activities, including the Energy Center Building, bore field drilling, underground piping installation, and customer equipment upgrades. Ensure adherence to project timelines, safety standards, and quality benchmarks.
- **Implementation Coordination:** Lead the integration of utility-side and customer-side workstreams, ensuring that internal teams, contractors, and vendors are aligned on construction sequencing, equipment delivery, and commissioning milestones.
- **Stakeholder Interface:** Serve as the primary point of contact for the CMV and other key stakeholders. Oversee execution of land use agreements, coordinate with municipal departments, and ensure that construction activities are synchronized with city infrastructure plans.
- **Customer Conversion Management:** Oversee the scheduling and execution of customer conversions, including energy assessments, HVAC and DHW system upgrades, and UTEN interconnections. Ensure minimal disruption to residents and businesses during implementation.
- **Contractor and Vendor Management:** Supervise third-party contractors responsible for excavation, mechanical installations, and system commissioning. Ensure compliance with project specifications, labor agreements, and safety protocols.
- **Operational Readiness:** Ensure that all systems—including SCADA, backup systems, and emergency protocols—are installed, tested, and ready for Stage 4 operations. Coordinate commissioning of the UDS, bore fields, and customer equipment.
- **Risk Mitigation:** Identify and proactively manage risks related to construction delays, supply chain disruptions, permitting, and community impact. Implement contingency plans and maintain clear communication with all project partners.
- **Reporting and Documentation:** Track construction progress, maintain detailed records, and support regulatory filings and milestone reporting. Ensure all construction and implementation activities are documented for future evaluation and scaling.

Engineering Manager: Leads the strategic development, implementation, and continuous improvement of all thermal engineering standards, procedures, and specifications across the organization. This role is also responsible for designing and

managing comprehensive training programs to ensure that engineering teams are equipped with the latest technical knowledge and best practices. In addition to thermal systems leadership, the Engineering Manager will lead the design and implementation of the SCADA system and all supporting IT infrastructure. This includes overseeing system architecture, integration with operational technologies, cybersecurity compliance, and ensuring real-time data acquisition and control capabilities are robust and scalable. The Engineering Manager collaborates closely with cross-functional teams to ensure that all engineering and IT systems are aligned with Pilot goals, regulatory requirements, and long-term operational efficiency.

Finance Manager: Oversees all financial aspects of the Pilot portfolio, including budgeting, forecasting, financial modeling, and expense tracking. This role manages vendor contracts, ensures timely and accurate financial reporting, and supports strategic decision-making through data-driven insights. The Finance Manager also ensures compliance with funding requirements and internal financial controls, playing a critical role in maintaining fiscal discipline and transparency.

Outreach, Marketing, and Engagement Manager: Develops and executes comprehensive outreach and engagement strategies to support project implementation through all stages (3a, 3b, and 4). This includes creating educational materials, managing media relations, and developing marketing campaigns tailored to diverse audiences about safety, energy management, and account information. The role involves direct engagement with internal stakeholders, external partners, and NYCHA residents to build trust, encourage participation, and facilitate access for HVAC equipment installation through various outreach methods in addition to community forums. The lead also tracks and reports on Customer Metric's to ensure compliance. Surveys will be sent to the diverse segments to measure campaigns for continuous improvements and goal to providing a +1-customer experience. Develop processes for contractors and training for UTEN customer contact employees such as Customer Experience Centers. Feedback loops with the Customer Experience Center to ensure inclusive and transparent communication for stakeholders.

Rates, Billing, and Account Management Manager: Responsible for the design and implementation of customer-facing systems and processes related to rate structures, billing, and account management. This includes finalizing rate design, ensuring seamless integration with customer information systems, and developing clear and accessible bill presentment formats. The role also oversees customer protections, manages fulfillment of

customer and thermal exchanger agreements, and ensures compliance with regulatory and contractual obligations.

7.4.4. UTEN Team Transition During Stage 3 Approval Period

Following the submission of the Stage 2 filing in July 2025, the UTEN project team will enter a transitional phase while awaiting approval to proceed to Stage 3. During this interim period, the team will be strategically downsized to focus on core activities essential to maintaining Pilot momentum and readiness.

Several team members will be temporarily reassigned to other initiatives across the organization. However, a dedicated core group of 3 FTEs will remain in place to manage the following critical functions:

- Responding to Information Requests from the DPS Staff to support regulatory review and approval.
- Refining engineering designs in collaboration with CDM Smith, ZBF Geothermal, and other design partners to ensure readiness for procurement and construction.
- Maintaining stakeholder engagement, including ongoing coordination with the CMV, community organizations, and pilot participants.
- Advancing Stage 3 preparation work, including procurement planning, permit readiness, and internal alignment on construction and operations strategies.

This streamlined structure ensures that the UTEN Pilot remains responsive, technically sound, and strategically aligned while optimizing resources during the regulatory review period.

7.5. Labor and Workforce Learnings

1) Early and Inclusive Workforce Planning Is Essential

Establishing a dedicated WDC early in the Mount Vernon Pilot enabled Con Edison to align internal stakeholders across departments. This cross-functional collaboration was critical in defining the scope of work for geothermal borehole drilling, Energy Center construction, and customer equipment retrofits, allowing the Company to begin planning for training and staffing well in advance of field mobilization.

2) Skills Gap Assessment Is Critical

A formal skills inventory and gap analysis helped the WDC identify where additional training was needed, particularly in geothermal technologies such as vertical closed-loop borehole drilling and HDPE piping systems. This process informed the development of targeted training programs to

ensure that employees and contractors are equipped with the technical and safety competencies required for UTEN construction and long-term operations.

3) Training Must Be Multi-Modal and Role-Specific

Training programs for the Mount Vernon Pilot were designed to include classroom instruction, hands-on field experience (especially for borehole drilling and Energy Center systems), digital learning modules, and mentorship. Role-specific curricula were developed for field technicians, SCADA operators, CSRs, and bore field drilling crews to ensure operational excellence and customer satisfaction.

4) Specialized Equipment Requires Specialized Training

The use of geothermal drilling rigs, thermally enhanced grout systems, and pre-insulated HDPE piping required training that is not yet widespread in the local contractor market. Con Edison identified the need to work with union training centers, equipment vendors, and technical institutions to build this capacity in advance of full-scale UTEN deployment, ensuring that geothermal borehole installation and system integration are performed to the highest standards.

8. COST ESTIMATES

8.1. Overview

The Mount Vernon UTEN Pilot's updated total construction cost estimate, excluding contingency, is $119.39 million, reflecting a refined and fully engineered design. This represents an increase from the original $67.21 million estimate, driven by the inclusion of DHW loads, construction of a new Energy Center, and more accurate customer conversion costs. In addition, during Stage 2, the Company undertook a rigorous design and planning process that enabled the identification and refinement of all necessary cost categories.

Once constructed, the continuation of the pilot will incur ongoing operational expenses including energy consumption, maintenance, emergency response, data collection, and analysis.

In addition to startup construction costs, back-end systems such as SCADA and billing contribute to the overall cost profile and must be accounted for in long-term planning. A unique aspect of this Pilot is its implementation by a regulated utility, which introduces specific regulatory and compliance-related costs. This included previously underestimated components such as metrics collection, SCADA system design, and emergency response protocols.

Table 12 shows the updated cost estimates organized by the various stages of the UTEN Pilot. To support this effort, the Company retained the services of a professional construction estimating firm. With these services and the completion of 100% design, the Company was able to provide more accurate estimates for cost categories than it could in Stage 1. The Company also reassessed the impact of inflation on construction costs for Stage 3 of the pilot. Contingency levels were reduced from 30% to 15% to match standard Company procedure. Our cost estimates also assume a 5% tariff on all construction costs and 3% annual inflation. For the pilot operation period, a 15% contingency was also applied, given the significant uncertainty of operating costs. These efforts ensured that all necessary costs were identified and refined, while unnecessary expenditures were avoided. The result is a more realistic, optimized set of cost estimates that supports a scalable and resilient thermal energy network.

Table 12: Proposed Cost Estimate for Mount Vernon Pilot in All Stages ($$M)

Category	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Total
UDS Construction	-	-	13.71	-	-	13.71
Thermal Resource Construction	-	-	16.84	-	-	16.84

Thermal Resource ETS Construction	-	-	3.98	-	-	3.98
Customer Building Construction	-	-	42.45	-	-	42.45
Energy Center Construction	-	-	26.71	-	-	26.71
Design	0.45	4.27	2.95	0.10	-	7.77
Administrative	0.56	1.60	6.49	11.24	0.10	19.99
Operational	-	-	-	25.26	-	25.26
Outreach & Education	-	0.11	1.74	2.09	-	3.94
SCADA and Data Collection	-	-	4.52	2.46	-	6.98
Total	**1.01**	**5.97**	**119.39**	**41.16**	**0.10**	**167.63**
Contingency	-	-	17.91	6.17	0.02	24.10
Total w/ Contingency	**1.01**	**5.97**	**137.30**	**47.33**	**0.12**	**191.73**

8.2. Cost Categories

The following outlines the primary cost categories associated with the implementation of the UTEN Pilot. Each category reflects a critical component of the Pilot's infrastructure, operations, and community engagement strategy. These investments collectively support the deployment of advanced geothermal technologies, customer integration, and system-wide performance monitoring to ensure long-term sustainability and operational excellence. Additionally, a dedicated allocation has been made for the integration of a Customer Relationship Management (CRM) system. This includes the deployment of Salesforce to streamline customer engagement, enhance visibility into energy usage patterns, and support the generation of detailed performance metrics.

Customer Conversion Construction – $42.45 million

This category includes the cost of retrofitting 42 existing buildings and one new Energy Center building with ground-source heat pumps and energy efficiency upgrades. It covers HVAC system replacements, DHW electrification, and associated electrical work to enable full integration with the UTEN.

Energy Center Construction – $26.71 million

Covers the design and construction of the new Energy Center building, which houses the pumps, SCADA system, and backup systems necessary to operate the UTEN. The building also includes office space for the CMV's Emergency Services. Importantly, the Pilot will not bear any incremental costs associated with constructing the additional floor of the Energy Center building designated for CMV Emergency Services. Furthermore, the fair market value of the lease for that floor over the five-year duration of the Pilot is also excluded from the Pilot's cost burden. These costs are being offset against the appraised easement value of the land required for the bore fields and the Energy Center Building, effectively reducing the overall land use expense to the project.

Bore field Construction – $16.84 million

Includes drilling and installation of 127 geothermal boreholes across four bore fields. This work provides the thermal energy resource for the UTEN and includes grouting, manifold piping, and thermal conductivity testing.

UDS Construction – $13.71 million

Encompasses the installation of over 11,000 feet of underground piping to distribute thermal energy between the bore fields, Energy Center, and customer buildings. Includes valves, service laterals, and pressure testing.

SCADA and Data Collection – $6.98 million

Funds the Supervisory Control and Data Acquisition (SCADA) system, which enables real-time monitoring, control, and performance tracking of the UTEN. Includes sensors, BTU meters, and integration with Con Edison's control systems.

Customer Outreach and Acquisition – $3,94 million

Supports community engagement, marketing, and enrollment activities. Includes door-to-door canvassing, town halls, educational materials, and incentives to encourage participation in the pilot.

Pilot Operational – $12.13 million

Covers the operational costs during the pilot period, including system commissioning, maintenance, customer support, and performance monitoring. Also includes contingency planning and emergency response protocols.

Administrative – $19.99 million

Includes project management, engineering design, legal, permitting, and regulatory compliance activities. Also covers internal labor, third-party consultants, and peer review of technical deliverables.

Property Tax – $13.13 million

This cost category reflects anticipated property tax obligations associated with utility-owned infrastructure deployed during the pilot. These costs represent estimated assessments levied by local jurisdictions over the 5-year pilot period.

8.3. Cost Drivers

Previously, the Company estimated a total Pilot cost of $82.57M for all stages of the Mount Vernon Pilot, inclusive of a 30% contingency cost. The Company is estimating a total cost of $191.73M for all stages of the Mount Vernon Pilot with a built-in 15% contingency cost. The cost of the Pilot has increased since the last filing due to several key factors:

1. **Changes to the Quantity and Cost of Bore Fields:**
    a. The Mount Vernon UTEN Pilot experienced a significant cost increase due to underestimating the per-borehole drilling cost and the associated land use expenses. Initial estimates did not fully account for the complexity of subsurface conditions, or the premium required for constrained urban drilling, resulting in a higher actual cost per borehole. Additionally, securing adequate land for the expanded bore field—driven in part by the need to serve all DHW loads—introduced unexpected acquisition and access costs. Together, these factors contributed to a material increase in total Pilot costs and highlighted the importance of early geotechnical analysis and land use planning in future UTEN deployments.
2. **UDS Conversion to Two-Pipe System:**
    a. In the original Stage 1 proposal, the system was designed as a single pipe ambient loop system. This is a design typically found in single-owner systems, such as campuses. In order to ensure fair rates and energy costs to all customers, it was determined that a two-pipe system would need to be installed, ensuring that all

customers received the same supply temperatures. This change resulted in an additional $3.8 million associated with the extra piping in the UDS.

3. **Data Collection Infrastructure**:
    a. The Mount Vernon Pilot introduced a number of new cost drivers that emerged only after the initial cost estimates were filed. As one of the first utility-scale thermal energy networks of its kind, the Pilot faced inherent challenges in forecasting costs with precision. Many of the technical and operational requirements became clear only as the design matured and fieldwork progressed.
    b. One of the most significant contributors to increased costs was the extensive data collection infrastructure required to support system monitoring, performance verification, and regulatory compliance. These requirements were not fully understood at the time of the original filing. As the project team engaged with stakeholders and refined the system architecture, it became evident that granular, real-time data would be essential for:
        i. Verifying thermal energy delivery to each customer
        ii. Supporting billing and cost allocation
        iii. Monitoring system performance and identifying inefficiencies
        iv. Meeting regulatory and reporting obligations
    c. To meet these needs, the Pilot had to incorporate hourly BTU metering at each customer site, a level of granularity far beyond what was originally envisioned. This requirement necessitated the inclusion of a monitoring-only SCADA system in Stage 2 of the Pilot. The SCADA system is responsible for collecting, transmitting, and managing data from across the network, including customer meters, central plant equipment, and distribution infrastructure.
    d. The addition of the SCADA system introduced new capital and operational costs, including:
        i. Hardware and sensors for each customer connection
        ii. Communication infrastructure to transmit data securely and reliably
        iii. Software platforms for data visualization, analytics, and control
        iv. Integration with utility billing and customer service systems
        v. Ongoing IT support and cybersecurity measures
    e. The total estimated cost for the SCADA system is approximately **$6.98 million**. These elements were not part of the original scope and represent a substantial investment in digital infrastructure. However, they are now recognized as essential to the long-term

success and scalability of the UTEN. The inclusion of SCADA reflects a broader industry shift toward data-driven energy systems and underscores the importance of adaptive planning in first-of-a-kind projects.

4. **Improved Precision of Customer Conversion Costs**:
    a. The original Stage 1 proposal assumed that the buildings in the area would require a moderate amount of retrofit work to adopt a UTEN system. Upon building assessments being completed in Stage 2, it was determined that the building stock in this neighborhood requires significant amounts of work in order to make them UTEN ready. The original estimated amount of dollars towards customer building retrofits was significantly larger than the final estimate post building assessments.
    b. The customer conversion cost estimates for the Mount Vernon Pilot increased significantly as the project team gained a more detailed understanding of building-specific conditions through on-site assessments. These assessments, conducted across the full portfolio of participating buildings, revealed a range of technical and logistical challenges that were not fully captured in the original cost estimates.
    c. Key drivers of the cost increases include:
        i. **Building-Specific HVAC Conditions**: Many buildings had aging, undersized, or incompatible HVAC systems that required more extensive retrofits than initially anticipated. In some cases, entire mechanical rooms needed to be reconfigured to accommodate new equipment, including heat pumps, distribution piping, and control systems.
        ii. **Unanticipated Infrastructure Needs**: Site visits uncovered deficiencies such as insufficient electrical capacity, lack of space for thermal interface units, and outdated plumbing configurations. These findings necessitated additional design work and construction scope to bring buildings up to compatibility with the UTEN.
        iii. **Design Adjustments for Code and Safety Compliance**: As the design matured, it became necessary to incorporate new requirements related to refrigerant safety, ventilation, and equipment accessibility. These adjustments were particularly important in multifamily and institutional buildings, where occupant safety and regulatory compliance are paramount.
        iv. **Refrigerant Regulation Impacts**: The evolving landscape of refrigerant regulations—particularly the phase-down of high-GWP refrigerants—required the design team to select alternative systems and components that comply with

new standards. This limited the range of available technologies and, in some cases, increased equipment and installation costs.

d. As a result of these factors, the customer conversion scope expanded beyond the original assumptions, leading to higher capital costs and more complex implementation planning. These refinements reflect a more accurate and realistic understanding of what is required to deliver reliable, safe, and code-compliant thermal service to each building in the network.

5. **Impact of Domestic Hot Water (DHW) Exclusion from Original Scope:**
    a. A significant factor contributing to increased costs in the Mount Vernon Pilot was the initial exclusion of DHW as a required service from the Pilot scope. The original design and cost estimates were centered around providing space heating and cooling through the UTEN, without accounting for the year-round thermal demand associated with DHW.
    b. As the Pilot progressed and guidance was given requiring DHW for all connecting buildings, the design of the Pilot needed to be updated accordingly—particularly multifamily residences, community centers, and institutional facilities. This realization had several cascading effects:
        i. **Building Conversion Complexity**: The addition of DHW required substantial modifications to the building-level conversion designs. New DHW systems had to be integrated into each building's mechanical room. This increased both the material and labor costs associated with customer conversion.
        ii. **System Design Revisions**: The central system, including the Energy Center and distribution network, had to be re-engineered to accommodate the continuous thermal load of DHW. Unlike space heating, which is seasonal, DHW demand persists year-round, requiring the system to operate at higher baseline capacity and with greater redundancy.
        iii. **Thermal Load and Capacity Planning**: The inclusion of DHW significantly increased the total thermal load on the system. This necessitated upsizing of equipment, expansion of bore field capacity, and adjustments to control strategies to ensure reliable service delivery across all thermal use cases.
    c. **Cost Implications**: These design changes led to increased capital costs in multiple categories, including Energy Center construction, building conversion, and thermal resource infrastructure. The need to retrofit DHW into the system after initial design milestones had been reached also introduced inefficiencies and rework.

d. In summary, the late-stage requirement of DHW as a core service requirement reshaped the technical and financial profile of the Pilot. While it enhanced the value and completeness of the UTEN offering, it also introduced substantial new costs and design complexity that were not anticipated in the original cost estimates.

6. **Addition of Energy Center Construction Costs**:
   a. The original cost estimates submission for the Mount Vernon Pilot did not account for the construction of the physical Energy Center building. At the time of the initial filing, the location and design specifications of the Energy Center had not yet been finalized. As the Pilot progressed and the design matured, it became evident that a dedicated facility would be required to house the central mechanical and electrical systems essential for operating the UTEN.
   b. This realization led to the development of a detailed cost estimate for the Energy Center, which includes structural elements (e.g., concrete, masonry, metals), building systems (e.g., HVAC, plumbing, electrical), and site work (e.g., earthwork, utilities, exterior improvements). These costs are captured under the "Energy Center Construction" category and amount to approximately **$26.71 million** without contingency.
   c. Additionally, inflationary economic conditions have significantly impacted the cost of construction materials and labor. The prices of key inputs such as steel, concrete, and piping have risen, and labor costs have increased due to market dynamics and regional wage adjustments. These inflationary pressures have contributed to the upward revision of the Energy Center's construction cost estimates.
   d. The original conceptual version of the Pilot included costs for repurposing an existing single-family home in the area as the Energy Center. During Stage 2 it was realized that additional space would be needed, and that the ideal location of the ECB would be near the Fire Station. In order to secure this space, a collaboration was done with the CMV, which resulted in the 2-story building that was eventually designed. The larger, more complex building resulted in an increase of $10 million to the estimate cost, which is a 6% increase.

8.4. Cost Optimization

During Stage 2, the Company implemented several cost optimization strategies to ensure fiscal responsibility while maintaining project integrity. These included reducing the number of participating buildings and bore fields, optimizing the UDS design to eliminate the need for

additional heat exchangers between separate loops, and prioritizing customers most likely to enroll. The Energy Center was strategically located at the center of the network and adjacent to the two largest bore fields, allowing bore field pumps to be housed within the building. This siting improved operational efficiency and reduced infrastructure costs. Additionally, the Energy Center was designed to incorporate air-source heat pumps (ASHPs), which help optimize system performance and reduce the total number of bore fields required.

In additions to the cost optimization strategies outlined above, the Company is actively implementing measures to reduce Pilot costs, including the following:

- **DOE Grant**: The Pilot was submitted for funding consideration through the DOE; however, it was ultimately not approved for grant funding.
- **ITC Credit**: The Company is exploring potential tax benefits under the Investment Tax Credit (ITC) program. A tax consultant will be engaged to maximize potential savings for ratepayers if the Pilot advances to Stage 3. Current internal assessments indicate a potential 30% ITC tax benefit on all capital expenditures associated with the Pilot. This potential benefit is not factored into the cost estimates or revenue requirements.

8.5. Decommissioning

If the Company needed to decommission the pilot and restore participating customers to their original service conditions, the Company at this point estimates the cost of the decommissioning effort would be approximately $26 million. This includes $3 million in 2031 and $2 million in 2032 for the retirement of the UDS, $2 million in 2031 and $2 million in 2032 for the retirement of the Energy Center, and $1 million in 2031 and $1 million in 2032 for the retirement of the Thermal Resource. Additionally, the Company estimates $12 million in 2031 and $3 million in 2032 for customer re-conversion costs, which reflect the expenses associated with restoring customer buildings to their original heating and cooling systems.

8.6. Cost Estimates Learnings

The Mount Vernon UTEN Pilot surfaced several key insights that will inform future thermal energy network planning and implementation:

1) Refined Customer Conversion Scope

Initial estimates underestimated the complexity of retrofitting a diverse building stock. Site assessments revealed aging infrastructure, limited mechanical space, and code compliance issues that required more extensive upgrades than originally anticipated.

2) Energy Center Redesign

The original plan to repurpose an existing structure for the Energy Center was replaced with a new, purpose-built facility. This change was necessary to accommodate SCADA infrastructure, backup systems, and municipal office space, improving long-term functionality and integration with city services.

3) SCADA and Data Collection Requirements

The need for real-time, granular data collection to meet performance metrics led to the inclusion of a full SCADA system. This added complexity and cost but was essential for monitoring, billing, and regulatory compliance.

4) Domestic Hot Water (DHW) Integration

The original design excluded DHW loads, which were later mandated. This required re-engineering of both customer-side systems and central infrastructure to accommodate year-round thermal demand, increasing system complexity and thermal load.

5) Two-Pipe System Upgrade

Transitioning from a one-pipe to a two-pipe UDS was necessary to ensure equitable thermal delivery and simplify customer-side equipment. While this improved system performance, it also introduced additional infrastructure requirements.

6) Inflation and Market Volatility

Rising costs for materials and labor—driven by inflation and regional wage adjustments and tariff uncertainty—contributed to upward revisions in nearly all cost estimate categories. These market dynamics highlighted the importance of contingency planning and early procurement.

7) Land Use and Bore Field Adjustments

Changes in land availability, including the loss of a major bore field site due to city development plans, required the addition of two new bore fields and rerouting of infrastructure. These adjustments increased both construction and permitting complexity.

8) Contingency Optimization

As design certainty improved, contingency allocations were reduced, reflecting greater confidence in cost estimates and risk mitigation strategies.

9) Test Borehole Cost Underestimation

The initial cost estimate for borehole installation was based on a test borehole that did not fully account for the water collection, fencing, and restoration measures required to ensure minimal disruption and a high-quality outcome for the community and property owner. These additional site-specific requirements significantly increased the actual cost of bore field construction.

These learnings reflect the challenges and opportunities of implementing a first-of-its-kind utility-scale thermal energy network in a suburban, disadvantaged community. They will serve as a critical foundation for future UTEN deployments across New York State.

9. COST RECOVERY AND ACCOUNTING TREATMENT

Related to cost recovery, the Company requests the following:

- All UTEN costs be recovered from Electric customers;
- All UTEN costs be recovered as a surcharge as an element of the Monthly Adjustment Clause (MAC)/ Power Authority of the State of New York (PASNY).
- Capital costs be recovered per standard ratemaking practice;
- All other costs, including O&M and Customer Equipment, be recovered as regulatory assets receiving rate of return of the current rate plan;
    - The share of Customer equipment upgrades the Company covers be amortized over 15 years;
    - Any Company infrastructure that does not go into service or leaves service early (including removal costs), be amortized over 15 years;
    - All other regulatory assets be amortized over 5 years; and

The Company further requests that all UTEN revenues flow back to Electric customers as credits via these same surcharges on an annual basis.

The Company proposes cost recovery from Electric customers because UTEN systems, like the Mount Vernon Pilot, have the potential to help achieve CLCPA goals with exceptional efficiency and correspondingly lower electric system expansion costs. Thus, recovery from electric customers properly aligns UTEN costs with the energy commodity associated with these benefits. Recovery from electric customers will result in lower bill impacts compared to recovery from gas customers due to the greater number of electric customers and the larger size of the electric business. The estimated revenue requirement impacts for electric versus gas customers for Stages 1-4 are presented in Table 13.

Table 13: Estimated Customer Bill Impact

If UTEN Recovered Exclusively From:	Average Bill Impact (%)	Residential Bill Impact (%)
Electric Customers	0.14%	0.10%
Gas Customers	0.52%	0.51%

The Company will pursue applicable tax credits for this Pilot where eligible. The Company will claim tax credit(s) in accordance with IRS Normalization rules and provide the benefit to electric customers when realized.

9.1. Stages 1-2 Costs

The Company requests approval to begin surcharge recovery of the revenue requirement associated with costs incurred for Stages 1-2 subject to the $7.1MM cap set by the Commission in its September 2023 Order and its December 2024 Order.[20] If the Pilot is approved to move to Stage 3, the Company proposes to recover Stages 1-2 costs as detailed above. If the Pilot is not approved to move to Stage 3, the Company proposes to recover all costs incurred through the end of Stage 2 as a regulatory asset amortized over 5 years from the date of the Commission's Order not approving progression to Stage 3.

9.2. Stage 3 Costs

The Company requests surcharge recovery during Stage 3 of the revenue requirement for approved Stage 3 costs as capital is put in service or expenses are incurred. See the Cost Estimates section for the values and discussion of these costs.

The proposed Pilots are the first of their kind in the Company's service territory and NYS. As such, there is an increased risk that the Company will encounter novel construction, operational and business challenges that are outside of its experience and expertise managing electric, gas, and steam projects. Novel areas where the risk of encountering such challenges is elevated include installation of geothermal boreholes], installation of UDS heat exchangers, upgrades to customer buildings needed to connect to the network, Thermal Customer agreements, and most aspects of ambient temperature geothermal network operation and maintenance. These novel construction challenges could result in costs that exceed the standard contingency of 15 percent the Company uses for standard capital projects. Additionally, there remains significant uncertainty related to inflation and tariffs on imported goods or goods that include imported components, such as water source heat pumps or customer heat exchangers.

To address these challenges, the Company proposes several steps to manage additional, unexpected costs. First, the Company requests the flexibility to move approved spending among approved Pilots and among Pilot categories. This flexibility would allow the Company to apply underruns in one area to manage additional, unexpected costs in another area. Second, the Company proposes a reporting and governance framework that provides the Commission and DPS Staff transparency and oversight into Pilot costs and cost forecasts. As Stage 3 progresses, the Company proposes to file monthly expenditure reports and quarterly (or

[20] *UTEN Proceeding*, Order Addressing Petitions of Con Edison and National Grid for Relief of Cost Cap Through Stage 2 (December 20, 2024) (*December 2024 Order)*.

more frequently at the Company's discretion) cost forecast reports. If a cost forecast filing exceeds the PSC-approved Stage 3 cost estimates (inclusive of contingency), then the Company would accompany the Report with either an informational filing or a petition, as proposed below.

- **Informational filing for costs less than 20 percent of the Stage 3 cost estimates (Threshold)**. If additional Stage 3 costs are forecast to be less than the Threshold, then the Company would accompany its Cost Report with an informational filing that details the increased costs and their causes. If DPS Staff approves or does not object in writing within 30 days of this informational filing, the Company would be authorized to begin recovery of the additional revenue through the surcharge. However, if within 30 days of the informational filing DPS Staff objects to the revised cost estimate, the Company would, after protecting customer and/or public safety and ensuring that customers have adequate access to heating and/or cooling and full use of their buildings, pause work on the Pilot.[21] It would then petition the Commission for recovery of the revenue requirement of the additional costs along with the costs required to remobilize its construction vendors to resume work or other relief.
- **Filing for costs above the Threshold.** If Pilot costs are forecast to exceed the Threshold, then the Company would pause work as described above and petition the Commission for recovery of these additional costs or seek other relief.

9.3. Stage 4 Costs

The Company has included in this filing estimates for Stage 4 costs to operate the Pilot. During Stage 3, the Company will provide updates to these cost estimates and file with the Commission for approval of surcharge recovery of the revenue requirement during Stage 4.

9.4. Recovery of Costs to Remove Participants from or Decommission the Pilot

Participating in this Pilot will require substantial modifications to participants' buildings to connect to the UTEN. This will include the removal or decommissioning of existing heating and cooling equipment, leaving Customers heavily reliant on the UTEN. Thus, participants require assurance that they will be made whole if they elect to leave under the allowed circumstances in the Customer Agreement, or if the Company shuts down the Pilot.

[21] To the extent these costs necessary to pause the Pilot were to lead Pilot costs to exceed the PSC-approved Stage 3 cost estimates, the Company requests it would recover this excess, in the same manner as other costs detailed above.

Directional estimates of these costs are included in the Cost Estimates section of this filing. However, accurately forecasting such costs is complex and difficult as the equipment will be in customer building spaces that the Company does not control, and the act of decommissioning or removal would not incur until six or eight years from this filing. Over time, we anticipate there will be changes to materials and equipment pricing and availability, building codes, and the condition of participating buildings (such as from renovations, improvements, repairs, or damage). Thus, the Company requests the Commission approve recovery of the revenue requirement of prudently incurred costs associated with restoring participant building spaces and heating and cooling systems during Stages 3, 4, or 5. It will be a struggle to enroll participants without this approval or an alternative framework that allows the Company to make these commitments, which participants have expressed they need to enroll in the Pilot.

The Company requests similar approval of cost recovery of costs required to protect public safety and right of way if the Pilot needs to be decommissioned. These costs face similar levels and causes of uncertainty. Directional estimates of these costs are also included in the Cost Estimates section of this filing.

9.5. Stage 5 Costs

The Company proposes in Year three of the Pilot, to file a petition in this proceeding with its proposal for a "Post Pilot Period." This will include a proposal for recovery of and estimates for all costs to continue to operate and/or expand the network as well as proposals on post-pilot thermal rates.

9.6. Cost Treatment in the Event Commission Orders Sale of Pilot

If the Commission at any time Orders the sale of the UTEN to a third party, the Company proposes to use those sales proceeds to offset ratably its remaining undepreciated capital assets and/or unamortized regulatory assets, with any remaining proceeds accruing to the benefit of Electric customers.

10. RATE DESIGN

10.1. Overview

The UTEN Pilot Rates were designed to instill confidence in participants regarding the financial benefits of being connected to the UTEN to enable sufficient levels of customer participation in the pilot. These rates are not designed to cover the full costs associated with the pilot and will be clearly outlined in customer agreements to ensure transparency. The goal of the subsidized pilot thermal rates is to help most Disadvantaged Community (DAC) buildings experience lower energy bills over the course of the pilot compared to their previous costs so that the Pilot sign up a sufficient number of customers to participate.

10.2. Analysis Approach

For Mount Vernon customers, the rate structure was specifically designed to prevent bill increases and provide special safeguards for vulnerable customers. This was done by using the results from the energy modeling described above to model out customer bills while on the Pilot, and back into thermal rate levels that saved most participants money. Bill Protections, described in the Customer Protection section, will protect Customers whose energy bills still rise when connect to the Pilot.

Residential customers, defined as those with 1-4 dwelling units, in Mount Vernon will be subject to a fixed monthly connection fee. The objective in setting the monthly connection fee was to have the typical customer see some savings in their total energy bill as a participant in the pilot. Additionally, it is anticipated that some customers' heating and cooling usage will increase after connecting to the UTEN, due to the customer base historically under-heating and under-cooling. This expectation has been factored into setting the monthly customer fee. The Company decided to use one fee for all small residential properties to simplify the pilot and provide more clarity to customers. The variation in thermal energy usage between homes is likely to be small enough that a fee designed for each building would not be meaningfully different.

However, based on its analysis, the Company found that 46% of all residential participants are expected to achieve overall energy bill savings, factoring in electric bills, thermal fees and gas bills (if cooking gas remains) even if the thermal fee were $0. The Company determined that a thermal fee of $10/month allows the remaining 1-4 family homes to see bill savings on the UTEN.

The primary reason for the low percentage of residential customers receiving savings is that in buildings where tenants currently pay for heating or cooling (10 buildings), that portion of the energy bill will shift to the owner (i.e., the Thermal Customer) under the new structure. As a result, while the tenants and the building as a whole will see a decrease in energy costs, the

owner does not realize bill reductions. However, the bill protection mechanism allows owners to not be at a financial disadvantage by capping their responsibility at their historical share of the energy bill. The bill protection not only shields the owner from increased costs; it keeps additional energy burden from being transferred to tenants.

Additionally, historic under-heating (2 buildings) and under–cooling (26 buildings) contributes to the low percentage of overall residential customers who are expected to achieve overall energy bill savings. Customers who have been without window air conditioning units in the summer and who reserve heat usage in the winter, were not determined to realize a savings once connected to the network as it is expected their heating and cooling will increase from historic usage. These customers will also benefit from the bill protection, allowing them to not pay more than they historically have, and causing undue energy burden

For all other participating customers—including multi-family buildings, commercial properties, and religious institutions in Mount Vernon—the Company will charge a fixed monthly connection fee based on the heat exchanged capacity ($1.20/ton of heat exchanger capacity per year). Unlike in the residential segment, there is likely to be significant variability on usage of the system based on the size and occupancy of these buildings. Therefore, the Company will determine the monthly connection fee for each customer by multiplying the capacity of the heat exchanger that will be installed on the customer's property by a factor of $1.20 per month. As with residential customers, the Company aims to provide savings on total energy costs to participants.[22] The rate was designed so that even with the thermal fee, most (67%) of large customers will still see a savings.

At Ebony Gardens specifically, while the buildings are projected to experience net energy bill savings under the pilot, the owner is not expected to see savings since historically, the owner only paid for heating while tenants covered cooling costs. Under the pilot, the owner assumes responsibility for both heating and cooling, resulting in a higher total energy burden despite overall efficiency gains. This is discussed further in the Customer Protection section.

10.3. Unsubsidized Rate Analysis

A detailed Rate and Pricing Analysis compared these pilot rates with what a fully cost-reflective rate structure of the Company's costs to build and operate the utility-owned

[22] The expected connection fee and electrical bill for each non-residential customer is included in the Appendix.

infrastructure would entail.[23] Both 1-4 family residential customers and all other participating buildings will receive highly subsidized rates during the Pilot. Residential customers in 1-4 family homes will pay a fixed monthly rate of $10.00, compared to an estimated cost-based rate of $3,657.85 per month. Large customers will be charged a fixed monthly rate per ton based of their installed heat exchanger. Their subsidized monthly rate will be $1.20 per ton of heat exchanger capacity, compared to the full cost-based estimated rate of $466.96 per ton. These subsidized rates are designed to promote participation and affordability while having customers still contribute to the financial viability of the network.

Throughout the Pilot, the Company will continue to analyze the rate and pricing structures. The pilot rates will be evaluated against what a true cost-based rate would be ("shadow billing"), which will help the utility identify the pilot costs that will not be recovered by the pilot participants and must be covered by electric customers Comparing subsidized rates to cost-based rates will inform future rate design or thermal energy fees.

10.4. Rate Design Learnings

Rate design for the Mount Vernon UTEN Pilot yielded several key insights that will inform balancing affordability, scalability and fairness.

1) Subsidized Rate Structure and Affordability

The pilot employed highly subsidized rates, with electric ratepayers covering a significant portion of costs.

- A flat $10/month charge for smaller residential customers, based on energy modeling, provided predictability and simplicity, encouraging participation.
- A $0.10 per MBH heat exchanger capacity per month charge introduced a demand-based element, aligning more closely with infrastructure capacity while still subsidized.
- These rates, while effective for participation, highlight the financial challenges of small-scale pilots where economies of scale are not yet realized.

2) Transitioning Toward Cost-Reflective Pricing

The discrepancy between subsidized rates and true cost-based models underscores the need for future rate structures to continue to operate at a subsidized level.

- This transition must be managed carefully to ensure equitable growth and avoid alienating customers already burdened by energy costs.

[23] This section excludes Company-covered customer building upgrade costs because in the future the Customers and/or the NYS building electrification incentive programs would most likely pay for these costs, not the Thermal network.

- Phasing out subsidies over time can help minimize financial shocks and support long-term network sustainability.

3) Customer Affordability Constraints and Feedback

Customer feedback indicates that participants cannot afford to pay more than their current energy bills.

- Although the pilot includes bill protection and is designed to yield savings, affordability remains a critical constraint for future rate design.
- Tiered pricing or targeted incentives may be necessary post-pilot to support low-income participants.

4) Importance of Transparent Engagement and Education

Customers emphasized the need for clear, upfront communication about both pilot and post-pilot pricing.

- Transparent engagement helps customers feel informed rather than pressured, enabling them to optimize energy use responsibly.
- Without consistent communication and support, trust in the pilot could erode, jeopardizing its success.

5) Supporting a Smooth Customer Transition

As customers adapt to a new heating and cooling system, they must feel supported and not overwhelmed.

- Clear guidance, assistance, and energy-saving tips are essential to build confidence and ensure a smooth transition.
- A well-managed transition away from subsidies can foster a more resilient and equitable thermal energy network.

6) Maintaining Bill Savings with Owner/Tenant Cost Shifts

A key challenge in designing pilot rates are the situations where the transition to centralized thermal service means that owners will assume responsibility for heating or cooling energy costs for which they were historically not responsible. This shift risked undermining participation in the Pilot. To protect tenants, it was determined that if an owner is responsible for both heating and cooling or either heating and cooling, the thermal fee and associated electric costs would fall on the owner. Thermal rates and bill protections were designed to keep costs down for those building owners who would be absorbing new energy burdens.

11. CUSTOMER PROTECTION PLAN

11.1. Overview

To guarantee that all participants – particularly those in disadvantaged communities – experience equitable, affordable, and transparent access to clean energy, the Mount Vernon UTEN Pilot includes a robust Customer Protection Plan. This plan is designed to eliminate financial risk for customers by keeping their energy costs from exceeding historical levels, while also providing clear, legally binding agreements that outline service terms and protections. By prioritizing bill predictability, customer choice, and ease of understanding, the plan builds trust and confidence in the pilot, enabling broader participation and supporting the long-term success of UTENs.

11.2. Bill Protections Objectives & Design Principles

Many buildings in the CMV currently lack sufficient cooling in the summer or heating in the winter. For the UTEN to succeed, it is essential that customers experience improved comfort. This may result in increased usage of heating and cooling systems – both in terms of durations and conditioned square footage- relative to historical patterns. In such cases, the energy savings from envelope upgrades and high-efficiency UTEN equipment may be offset by increased demand, underscoring the need for robust customer protections.

A significant portion of Mount Vernon residents already face challenges in managing their energy bills, with some experiencing financial hardship. The UTEN Pilot is designed to deliver tangible benefits to the community, including upgraded building systems, improved indoor comfort, economic development, job creation, and access to innovative clean energy technologies. The pilot is not intended to impose additional financial burdens. While the thermal rates are designed to maintain or reduce customers' historical energy costs, additional bill protection mechanisms have been incorporated to prevent any increase in energy expenses resulting from the transition to electric-powered UTEN heat pumps.

To support participation among customers, the pilot includes clear and easy-to-understand protections that cap their energy costs during the pilot. This protection is especially important in situations where customers may increase their heating and cooling usage. The pilot will maintain a positive incentive for customers to manage their energy use, establish guardrails, and structure processes to identify and address possible misuse.

- **1-4 Family Residential Customers** will receive bill protection based on their historical energy bills, establishing a maximum annual payment for energy usage throughout the pilot.

Residential customers will know the maximum they will pay every year for the 5-year pilot as described in their Customer Agreement located in the Appendix.

- **Large Customers** will receive heating and cooling cost protection based on their historical heating and cooling usage instead of historical billing as with the residential customers. Commercial customers will not pay more for heating and cooling on UTEN than they would have if they remained on their conventional equipment, based on modeled energy costs of historic usage which will be calculated at the end of each pilot year.

11.3. Bill Protections Methodology

To safeguard affordability and promote participation among residential customers, the Mount Vernon UTEN Pilot includes a structured bill protection mechanism that provides predictable energy costs throughout the pilot period.

11.3.4. Residential Customer Protections

The bill protection framework is designed so that residential customers do not pay more for heating and cooling on the UTEN than they would have under their legacy systems while still having an incentive to conserve energy. The approach involves:

- Identifying a “Protected Bill” amount based on historical utility consumption.
- Charging the customer the protected amount annually.
- Determining and applying credits for efficient energy consumption where applicable.
- Repeating this process annually for the duration of the five-year pilot.

The protected bill amount for each customer is calculated using the lowest total annual energy cost from the past three full calendar years (January through December). This amount serves as the maximum annual payment for heating and cooling during the pilot. Anomalous usage years will be handled on a case-by-case basis (i.e., a premise was vacant for a portion of any given year, would revert to the second lowest annual energy cost).

11.3.5. Residential Billing Structure

Customers may choose to pay their protected amount in one of two ways:

- Twelve equal monthly installments.
- A variable monthly schedule based on historical seasonal usage patterns (e.g., higher bills in summer and winter, lower in spring and fall).

Monthly bills will display both the protected amount and the actual usage-based cost, with the customer responsible only for the protected amount. A usage comparison chart will be included to promote awareness and responsible energy use.

11.3.3. Residential Annual Reconciliation and Adjustments

At the end of each 12-month period:

- If the customer's actual energy cost is lower than the protected amount, a credit equal to the difference will be applied evenly across the following year's bills.
- If the actual cost exceeds the protected amount, no additional charges will be applied.

This process will be repeated annually, with a modest inflation adjustment applied to the protected amount in subsequent years.

11.3.6. Large Customer Protections

To encourage participation from commercial, institutional, and multifamily customers, the pilot includes a dedicated Heating and Cooling Cost Protection mechanism tailored to larger energy users. This approach protects large customers from incurring higher heating and cooling costs on the UTEN than they would have under their conventional systems, while maintaining incentives for efficient energy use. The protection is calculated through the following steps:

1. **Baseline Usage Modeling**: The customer's historical heating, cooling, and DHW usage is modeled under typical weather conditions.
2. **Cost Benchmarking**: At the end of each Pilot year, the modeled usage is used to calculate what the customer's energy costs would have been using the year's rates, adjusted for actual weather conditions.
3. **Third-Party Verification**: A neutral Measurement & Verification (M&V) vendor will perform the calculations to ensure accuracy and build customer confidence.
4. **Annual Comparison**: At the end of each year, the actual UTEN-related heating and cooling costs are compared to the benchmark. If the actual cost exceeds the benchmark, the customer will receive a rebate for the difference.

- Large Customer protections are narrower than residential customer protections, due to the need for stronger safeguards against unintended consequences or abuse because larger customers have greater potential to add significant new loads unrelated to heating or cooling during the Pilot period, which could unfairly shift costs to other ratepayers if full bill protections were applied.

Ebony Gardens

Historically, the owner of the multifamily complex, Ebony Gardens has covered heating expenses, while tenants have been responsible for their own cooling costs. Under the pilot program, both cooling expenses and the thermal fee will now be billed to the owner. The owner will qualify for Heating and Cooling Cost Protections based on the total buildings' historical energy usage. The shift in responsibility may result in the owner passing cooling costs back to tenants. If that occurs, tenants who prefer not to use the heat pump during the cooling season will have the option to opt out, and the owner can deactivate those customers' heat pumps for that period.

11.3.7. Additional Protections and Considerations

- **Post-Pilot Protections**: The Company requests Pilot rates and protections remain in effect until modified by Commission order, with a minimum one-year notice period.
- **Landlord/Tenant Configurations**: UTEN equipment and metering are designed to prevent landlords from shifting energy costs to tenants. In cases where landlords pay utility bills, they will be responsible for both the UTEN thermal fee and associated electric costs.
- **Customer Engagement**: Bills will include targeted messaging to promote energy efficiency and responsible usage.

11.3.8. Guardrails and Oversight

To uphold program integrity and protect ratepayers, the Company has established a set of guardrails and oversight mechanisms within the bill protection framework. The Company reserves the right to adjust the base year used for bill protection calculations in cases where a customer's historical energy usage exhibits anomalies. Additionally, protections may be modified or revoked in instances of repeated misuse, such as the intentional addition of non-essential electric loads or patterns of reckless energy consumption. Any such adjustments will be subject to a defined escalation process, which includes notification to the DPS to ensure transparency and regulatory oversight.

11.3.9. Customer Education and Transparency

To support informed participation and promote responsible energy use, the Company will implement a comprehensive customer education and transparency strategy throughout the pilot period. Monthly utility bills will include tailored energy efficiency tips and usage comparisons to help customers understand and manage their consumption. Clear expectations, terms, and

protections will be outlined in the Customer Agreement to ensure transparency and build trust. Additionally, the Company will maintain ongoing communication with participants to reinforce energy-conscious behavior and provide guidance on how to maximize the benefits of UTEN.

11.4. Customer Agreements

Customer Agreements were developed to govern participation in the Mount Vernon UTEN Pilot, which operates outside of existing Company tariffs. These agreements establish the rights and responsibilities of both the Company and participating customers, including terms related to service, equipment ownership, billing, and protections. Each agreement outlines the five-year service period, during which the Company will install, own, and maintain the thermal infrastructure, while customers will own the in-building heat pumps and piping. Customers are required to notify the Company of any changes affecting thermal demand and to share performance data as needed.

- Customers may exit the program under two conditions: if the Thermal Energy Service fails to provide adequate heating or cooling and the issue cannot be resolved, or after three years of participation with written notice. In either case, the Company will restore the customer's original heating and cooling systems at no cost, with oil heating customers transitioning to gas (Large Customer whose property is used as a bore field for the network, will have the option of becoming a standalone geothermal system). Early termination outside these conditions will require the customer to bear the cost of alternative system installation. Upon program conclusion, the Company may elect to continue service or facilitate a transition back to legacy systems. The Company chose to return most customers to their original heating and cooling systems for the following reasons so customers would feel more comfortable with an exit strategy, rather than introducing yet another new technology. They can feel comforted knowing that they will be able to return to the technology they are most familiar with for their heating and cooling needs. Additionally, it is also generally more cost efficient to return customers to their previous source rather than introduce something new such as an ASHP. Should it be required that the Company offer customers an additional exit option to transfer service to an ASHP, our exit cost estimate will be updated accordingly.

In instances where tenants are the Customer of Record, a separate Building Upgrade/Service Access Agreement will be executed with the property owner.

These agreements govern the installation and maintenance of Company-owned infrastructure up to the ETS, with customers responsible for compliance with all applicable codes and for marking private utilities. The Company assumes no liability for pre-existing violations.

These agreements ensure clarity, accountability, and protection for all parties throughout the duration of the pilot. To enhance accessibility, a simplified “Residential Rights & Responsibilities” summary accompanies the full agreement, which is located in the Appendix. \

11.5. Customer Protection Plan Learnings

Customer Protections for the Mount Vernon UTEN Pilot yielded several key insights that will inform balancing affordability, trust, customer understanding of the pilot and fairness.

1) Customer Bill Protections Structures

The Pilot will include an overall bill protection for 1-4 family residential customers and a heating a cooling cost protection for all other customer

- 1-4 family residential customers need an easy-to-understand assurance that their overall bill will not increase on the Pilot. Without this, they have indicated they would not (and could not) participate in the Pilot.
- Larger customers have greater sophistication around managing their energy usage and thus are satisfied with the more limited assurance their heating and cooling bills on a new system will not increase compared to what they would have been.

2) Customer Agreements: Legal Integrity and Clarity

Customer agreements for the UTEN Pilot draw from practices across electric and gas but needed to be tailored to the unique characteristics of thermal energy networks. Key features include:

- Clarity and Accessibility: The Customer Agreement was written to be understandable while remaining legally binding. This includes defining terms like “Bill Protection” and “Heating and Cooling Cost Protection”, outlining billing structures and explaining customer responsibilities.
- Rate Structure and Exit Strategies: The Customer Agreement specifies the rate structures for 1-4 family residential customers and large customers and includes provisions for exiting the Pilot, such as minimum years of participation and conditions for returning to legacy systems.
- Guardrails and Oversight: Agreements include guardrails for customer protections and escalation procedures, DPS notification requirements and the right to adjust protections in collaboration with regulators.

12. RISKS AND MITIGATION STRATEGIES

Identifying and proactively addressing potential risks is critical to the success of the Mount Vernon UTEN Pilot. Table 14 outlines key barriers, their associated risks, and the mitigation strategies Con Edison will employ across the Pilot lifecycle.

Table 14: Barriers and Mitigation Strategies Matrix – Mount Vernon UTEN Pilot

Potential Barrier	Mitigation Strategy	Pilot Stage
Construction Delays Due to the complexity of the Mount Vernon UTEN Pilot—including construction of the Energy Center Building, trenching and installation of the two-pipe UDS system, drilling of four geothermal bore fields, service lateral installation, customer conversions, and full system commissioning—schedule delays are a distinct possibility.	Proactively manage the construction schedule and secure all required permits in advance to streamline installation and commissioning. Lessons from Stage 2 test pits (e.g., street obstructions) will inform construction sequencing. EH&S mitigation plans will be developed for buildings with known access or safety challenges.	Stage 3B – Construction
Novel or Unexpected Costs Costs not encountered in typical capital projects arise, leading to Pilot costs exceeding cost estimates	Cost governance and oversight framework (discussed in Cost Recovery & Accounting).	Stage 3B – Construction
Supply Chain Disruptions Delays in the availability of UDS components, geothermal drilling equipment, and residential heat pumps—especially due to refrigerant transitions—could impact Pilot timelines.	Include equipment availability requirements in RFPs and work closely with contractors to pre-order long-lead items. Engage multiple vendors to diversify sourcing and ensure timely delivery of geothermal drilling rigs, HDPE piping, and heat pump systems.	Stage 3B – Construction
Land Use Agreements Final agreements with the CMV are required for siting the Energy Center Building and drilling bore fields on city-owned property.	Continue proactive collaboration with CMV leadership to finalize land use agreements for the Energy Center and bore field easements. These agreements will be secured during Stage 3A to avoid delays in mobilization.	Stage 3A – Customer Enrollment
Customer Enrollment Challenges Limited awareness or reluctance from residential homeowners and multifamily property managers may hinder participation.	A Letter of Interest campaign was conducted prior to Stage 2 to gauge interest and communicate the benefits of participation, including free HVAC/DHW upgrades and bill protection. A comprehensive Customer Enrollment Plan has been developed to guide outreach and	Stage 3A – Enrollment Stage 3B – Construction Stage 4 – Pilot Operations

	engagement throughout Stages 3A–4.	

13. PROJECT EXECUTION

The following summarizes the Company's proposed workplan for the Mount Vernon Pilot, including key stages, activities, deliverables, and milestones:

13.1. Stage 3A: Customer Enrollment and Land Use Agreement Execution

Following approval of the Stage 2 filing, Con Edison will initiate Stage 3A activities to finalize all necessary agreements and prepare for construction of the Mount Vernon UTEN pilot. This phase is critical to securing customer participation, establishing land access for infrastructure, and laying the groundwork for successful execution in Stage 3B.

Key Objectives

- Finalize and execute the UTEN Customer Agreements with residential homeowners, multifamily property managers, houses of worship, and municipal building representatives.
- Finalize and execute land use agreements with the CMV for the ECBsite and geothermal bore field locations.
- Prepare for construction and operations by developing procurement documents, workforce plans, and SCADA integration strategies.

Planned Activities

- **Agreement Execution**
    - Finalize and execute UTEN Customer Agreements with:
        - 1–4 family residential homeowners
        - Multifamily complexes (e.g., Ebony Gardens, Greater Centennial Homes)
        - Community institutions (e.g., Doles Recreation Center, Fire Station)
        - Religious institutions (e.g., Macedonia Baptist Church, L.I.V.E. Church)
    - Finalize and execute land use agreements with CMV for:
        - Construction of the Energy Center Building adjacent to the Fire Station
        - Drilling and long-term access to geothermal bore fields at locations such as the Doles Recreation Center and W 4th Street Playground
- **Procurement Preparation**
    - Develop and issue Construction and O&M Requests for Proposals covering:
        - UTEN infrastructure (Utility Distribution System piping, bore fields, Energy Center)
        - Customer-side HVAC and DHW system upgrades
        - Engineering support during construction
        - Commissioning and start-up vendors
        - SCADA and IT systems

        - Long-term O&M support
- **Project Management Planning**
    - Finalize the Stage 3B Project and Construction Management Plan, including:
        - Construction sequencing and milestone tracking
        - Contractor oversight and safety protocols
        - Coordination with CMV departments and community stakeholders
    - Initiate SCADA system design and integration planning to enable real-time monitoring and control of the UTEN, including sensors, BTU meters, and alarms across the ECB, bore fields, and customer Energy Transfer Stations (ETSs)
- **Labor and Workforce Development**
    - Engage with internal stakeholders and external labor partners such as the NYSBCTC and UWUA Local 1-2 to finalize labor agreements
    - Launch internal workforce development activities, including geothermal drilling training, skills assessments, and safety certifications
- **Community Engagement**
    - Continue targeted outreach to residents and building owners, including:
        - Informational sessions and town halls
        - Energy assessment scheduling
        - Walkthroughs and Q&A sessions to support agreement execution and build trust

Deliverable

- Submission of the Customer Enrollment Letter to the PSC, confirming execution of all required customer and land use agreements and readiness to proceed to Stage 3B construction.

Milestone

- Approval of the Customer Enrollment Letter, authorizing the transition to Stage 3B construction and implementation.

13.2. Stage 3B – Construction and Commissioning

Upon approval of the Customer Enrollment Letter, Con Edison will initiate Stage 3B activities to construct and commission the Mount Vernon UTEN. This stage includes the full build-out of utility-owned infrastructure, geothermal bore fields, customer interconnections, and the ECB, as well as the installation and testing of the SCADA system. The Company will competitively

procure all construction and O&M contracts and manage the Pilot in accordance with the Stage 3B Construction Management Plan.

Planned Activities

- **Procurement and Mobilization**
    - Issue and evaluate construction RFPs for:
        - UDS piping and service laterals
        - Bore field drilling and Energy Transfer Stations
        - Energy Center Building construction
        - Customer-side HVAC and DHW retrofits
    - Award construction and O&M contracts
    - Support contractors in procurement of long-lead equipment, including geothermal drilling rigs, HDPE piping, and heat pumps
    - Finalize and implement the Stage 3B Project and Construction Management Plan
    - Commission the system
- **Construction Execution**
    - Construct the ECB, including:
        - Two-story structure with cellar
        - UDS pumps, bore field heat exchangers, SCADA control room, and Con Edison electric service
    - Drill and complete four geothermal bore fields, including:
        - Mobilization, drilling, grouting, and pressure testing
        - Installation of manifold piping and bore field Energy Transfer Stations
    - Complete all civil excavation and restoration for UDS installation:
        - Install 12” and 14” HDPE supply and return mains
        - Pressure test and backfill by section
        - Stub service laterals to property line isolation valves
    - Install and connect Con Edison-owned equipment in the ECB and UDS
    - Finalize SCADA system installation, including sensors, meters, and remote alarms
- **Commissioning**
    - Fill and pressure test the UDS
    - Program and test SCADA system
    - Commission the ECB, bore fields, and UDS infrastructure
    - Prepare for customer conversions and coordinate with building owners to minimize disruption

- **Workforce and Community Coordination**
    - Continue workforce development activities and monitor adherence to the PLA
    - Maintain communication with CMV and community stakeholders
    - Launch customer billing, care, and safety/reliability programs in preparation for Stage 4

Deliverable

- Completion of ECB, UDS, bore fields, and SCADA system installation
- Commissioning of all utility infrastructure and readiness for customer conversions

Milestones

- Construction start: Upon PSC approval of the Customer Enrollment Letters
- Construction and commissioning duration: 12–18 months from contractor mobilization
- Submit the UTEN System Commissioning Letter (covering ECB, bore fields, UDS, and customer equipment)

Table 15: Mount Vernon Hypothetical Construction Timeline

Task	Key Aspects	Start Week	End Week	Duration of Task
Acquire Permits	NYSDEC, City of Mount Vernon	1	23	23 weeks
Procurement	Award contracts, submittals, contractor mobilization	1	23	23 weeks
Civil ROW Construction Prep	Traffic plan, 811 mark out, subsurface interference plan, EHASP	1	40	40 weeks
Energy Center Building	Full structure, internal piping, electrical, SCADA, Con Edison control room	24	80	56 weeks
UDS Construction	Install 2 x 12” and 2 x 14” pipes, pressure test, backfill, restore, stub services	24	80	56 weeks
Bore Field Drilling	Mobilize, drill, grout, test four bore fields	24	72	48 weeks
Bore Field ETS Construction	Foundations, pump house structures, manifold piping	24	72	48 weeks
Start-Up and Commissioning	Fill UDS, SCADA programming, system commissioning	81	104	24 weeks

13.3. Stage 4: Pilot Operation and Management

Following the completion of construction and commissioning, Stage 4 will initiate full pilot operations. This phase includes customer conversions, system optimization, and ongoing performance monitoring. The Company will connect buildings to the commissioned UTEN system, implement operational programs, and begin collecting standardized metrics as required by the PSC.

Key Activities

- **Customer Conversions**
  - Extend service piping from property lines to building points of entry
  - Install internal HVAC and DHW equipment and complete energy efficiency upgrades where applicable
  - Convert and commission buildings to UTEN service
- **Operations and Maintenance**
  - Implement the UTEN O&M Oversight Plan for both Company- and customer-owned equipment
  - Monitor system performance and optimize operations using real-time SCADA data
  - Maintain adherence to the PLA and continue workforce development coordination
- **Customer Programs**
  - Launch UTEN Customer Billing, Care, and Safety/Reliability Programs
  - Establish regular communications with customers to share energy usage insights, efficiency tips, and gather feedback
  - Continue customer enrollment efforts as needed
- **Regulatory and Reporting**
  - Begin reporting standardized performance metrics at intervals defined by DPS Staff
  - File a proposal for post-pilot operations and rate structure

Deliverables

- Commissioned converted customer buildings
- Ongoing reporting of operational metrics and customer engagement
- Submission of post-pilot proposal

Milestones

- First customer connected to the commissioned UTEN system
- Completion of the 5-year pilot period
- Submission of post-pilot period filing

13.4. Stage 5: Pilot Review, Recommendations, And Conclusion

Stage 5 marks the final phase of the Mount Vernon UTEN Pilot and focuses on evaluating the Pilot's performance, documenting key findings, and providing recommendations for future thermal energy network (UTEN) development. This phase is critical for informing the PSC, stakeholders, and the broader utility community about the viability, scalability, and regulatory needs of UTENs in New York State.

In accordance with PSC directives, this stage will culminate in two major deliverables: a comprehensive Pilot Review and Recommendations Report and a Pilot Close-Out Report.

Key Objectives

- Conduct a full evaluation of the Mount Vernon UTEN Pilot's technical, financial, customer, and workforce outcomes.
- Document lessons learned across all five stages of the Pilot, including system design, construction, operations, customer engagement, and geothermal integration.
- Provide actionable recommendations for future UTEN pilots, full-scale deployments, and regulatory frameworks.
- Ensure transparency and accountability through public reporting and stakeholder engagement.

Planned Activities

Evaluation and Verification

- Analyze operational data collected throughout Stage 4, including SCADA metrics, customer feedback, and system performance.
- Perform Evaluation, Measurement, and Verification (EM&V) to assess energy savings, emissions reductions, and peak load impacts.
- Compare UTEN performance against baseline conditions and alternative electrification pathways such as air-source heat pumps (ASHPs) and VRF systems.
- Conduct lifecycle analysis and assess cost-effectiveness, pending final PSC guidance on metrics and methodology.

Documentation and Reporting

- Compile key findings related to:
    - Thermal energy balancing and optimization
    - Safety, reliability, and resiliency

    - Customer satisfaction and comfort
    - Workforce development and labor outcomes
    - Cost-effectiveness and lifecycle economics
- Summarize the effectiveness of customer protection measures and billing programs.
- Assess the impact of the UTEN on disadvantaged communities, consistent with the Climate Leadership and Community Protection Act (CLCPA).

Recommendations to the Commission

- Propose next steps for:
    - Scaling UTENs in dense urban environments like Mount Vernon
    - Integrating UTENs into new construction and redevelopment projects
    - Enhancing regulatory frameworks for rate design, cost recovery, and performance metrics
    - Expanding workforce training and MWBE participation

Close-Out Planning

- Develop a Pilot Close-Out Report detailing:
    - Final system status and customer transition plans
    - Any decommissioning or equipment repurposing strategies
    - Recommendations for continued service or integration into future UTENs

Deliverables

- **Pilot Review and Recommendations Report**: A comprehensive summary of pilot outcomes, learnings, and policy recommendations.
- **Pilot Close-Out Report**: A formal record of Pilot completion, including final system disposition and customer transition plans.

Milestones

- Submission of the Pilot Review and Recommendations Report to the PSC
- Submission of the Pilot Close-Out Report to the PSC

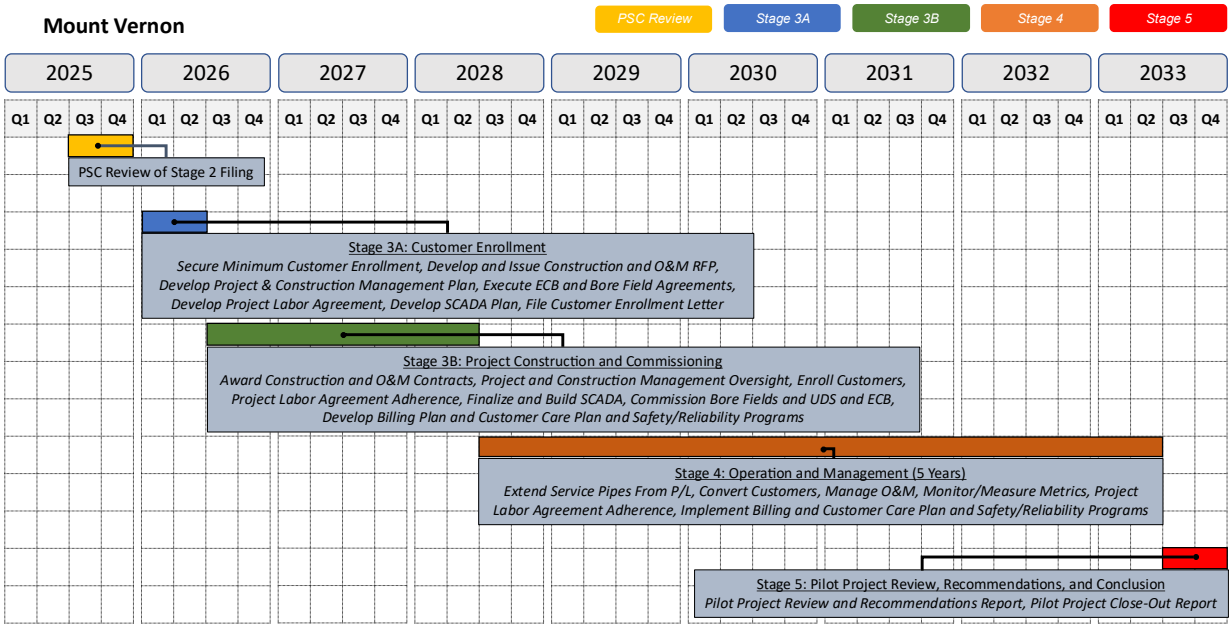

Figure 15: Illustrative Stage-Gating Timeline

14. METRICS

The September Guidance Order emphasized the importance of establishing clear and uniform metrics to ensure that Pilots yield meaningful insights. Applying a minimum set of standardized metrics across all pilot initiatives is expected to support the identification of best practices and inform future recommendations for system requirements. These standardized metrics will provide essential data to assist the Commission in developing rules that promote the adoption of thermal energy networks and ensure that ratepayer investments in these pilots generate maximum learning value.

The Order requires that metrics for these Pilots be categorized into four areas: (1) technical, (2) financial, (3) customer/societal, and (4) safety/reliability. In response, the Joint Utilities and DPS Staff engaged in a series of technical conferences to collaboratively assess which metrics would be most effective in capturing insights from the Pilot. The table below outlines the Company's proposed approach to measuring each metric, should the Pilot receive approval.[24]

The design team provided a matrix as a final deliverable listing the specific sensors implemented in the Pilot design or other strategies to satisfy all technical metrics. The delivered technical metrics matrix was filed confidentially and is located in the Appendix.

14.1. Metrics Learnings

1) Defined Metric Ownership and Data Boundaries

The Mount Vernon Pilot highlighted the importance of clearly delineating responsibilities for metric collection and reporting between utility-owned infrastructure (e.g., Energy Center, UDS, SCADA) and customer-side systems (e.g., ETS units, in-building sensors). Early ambiguity led to delays in assigning ownership for certain PSC-required metrics.

2) Embedded Metrics into Early Design

Several PSC metrics required specific instrumentation—such as BTU meters, temperature sensors, and runtime logs—that were not initially included in the early design. This led to late-stage design revisions to integrate metering and SCADA capabilities across the ECB, bore fields, and customer sites. Future UTENs should embed metric requirements into the Basis of Design from the outset.

3) Coordinated with External Stakeholders

[24] It is noted that the term "metric" in this context is intended solely for learning and evaluative purposes, it and does not carry the same implications as "performance metrics."

The Pilot underscored the need for early engagement with third-party building owners and facility managers, especially for multifamily and institutional buildings. Some metrics required access to building management systems (BMS) or coordination for in-building sensor installation, which was not always straightforward.

4) Planned for Data Processing and Analytics

Metrics such as thermal delivery hours, heat pump cycling, and system efficiency required post-processing of SCADA trend logs. This emphasized the need to build data analytics capabilities into the SCADA system architecture and ensure that data storage, retrieval, and processing workflows were in place before commissioning.

15. CONCLUSION

UTENs offer a transformative opportunity for New York State to reduce its reliance on fossil fuels, advance the goals of the CLCPA, and support the creation of clean energy jobs. By leveraging geothermal energy and innovative system design, the Pilot will deliver clean, reliable heating, cooling, and domestic hot water to a diverse mix of buildings in a Disadvantaged Community.

The Mount Vernon Pilot is firmly in the public interest. It will provide the Company with critical, first-of-its-kind experience in deploying a scalable UTEN, and will generate valuable insights into customer retrofit strategies, rate design, stakeholder engagement, and regulatory frameworks. These learnings will directly inform the Commission's development of a workable regulatory structure for UTENs and help shape the future of thermal energy infrastructure across New York State.

16. APPENDIX

1. Preliminary Real Estate Assessment
2. Basis of Design
3. Exploratory Test Pit Map
4. Site Survey Plan
5. Modeling
6. Component Proposal Forms
7. Drawing Packages
8. Civil Damage Prevention
9. Long Lead Time Register
10. Construction Specifications
11. Commissioning Procedures
12. Operating Procedures
13. Decommissioning Procedures
14. Emergency Plan
15. Construction Project Plan
16. USGS Test Borehole Analysis
17. Geothermal Memo: Test Borehole and TCT
18. Test Pit Results
19. ECB Geotechnical Report
20. Electric Load Letters
21. SCADA (I/O points)
22. Construction Permit List
23. Mass Energy Flow and Hydraulic Analysis
24. Phase 1 Environmental Site Assessment
25. Pipe Stress
26. Basis of Design Calculations
27. Energy Modeling Calculations
28. UDS System Architecture
29. Energy Center Concept Update

Public Outreach

30. Community Buildings and Businesses
31. Landlord
32. Residential Home
33. Residential Home on Leak Prone Pipe
34. Community Buildings and Businesses
35. Landlord
36. Residential Home
37. Residential Home on Leak Prone Pipe
38. Bore hole work notice email
39. Go from Zero to TEN Email Sample
40. Go Geothermal, Get $50 E Gift Card Email Sample 1
41. Go Geothermal, Get $50 E Gift Card Email Sample 2
42. Join Our Zero-Cost Thermal Energy Network Email Sample
43. Letter of interest email sample
44. Outreach event at Purdy Park Email Sample
45. Con Ed UTEN News Article _01292025
46. Letter of Interest Hardcopy Sample
47. Mount Vernon Community Outreach Photos

48. Mount Vernon Construction & Park Signage
49. Mount Vernon Gift Card Terms English & Spanish
50. Mount Vernon Lawn Sign
51. Mount Vernon No Access Sticky note
52. Mount Vernon UTEN One-Sheet
53. Mount Vernon Website
54. Postcard sample mailing
55. Town Hall Community Meeting Invite
56. UTEN Energy Efficiency Kit
57. UTEN Geothermal Podcast
58. UTEN Graphic poster for Town hall
59. UTEN Mount Vernon Doorhanger
60. UTEN poster for Mount Vernon City Fest
61. UTEN vehicle magnet
62. Vendor workforce workshop event
63. Where's My Home Sign - MV Town Hall
64. Mount Vernon Customer Journey Map

Residential Building Profiles

65. 111 S 7th Avenue, Mount Vernon, NY 10550
66. 113 S 7th Avenue, Mount Vernon, NY 10550
67. 113 S 9th Avenue, Mount Vernon, NY 10550
68. 115 S 7th Avenue, Mount Vernon, NY 10550
69. 117A S 9th Avenue, Mount Vernon, NY 10550
70. 119 S 9th Avenue, Mount Vernon, NY 10550
71. 119A S 9th Avenue, Mount Vernon, NY 10550
72. 121 S 9th Avenue, Mount Vernon, NY 10550
73. 130 S 9th Avenue, Mount Vernon, NY 10550
74. 134 S 9th Avenue, Mount Vernon, NY 10550
75. 138 S 9th Avenue, Mount Vernon, NY 10550
76. 142 S 9th Avenue, Mount Vernon, NY 10550
77. 146 S 9th Avenue, Mount Vernon, NY 10550
78. 150 S 9th Avenue, Mount Vernon, NY 10550
79. 154 S 9th Avenue, Mount Vernon, NY 10550
80. 215 S 6th Avenue, Mount Vernon, NY 10550
81. 229 S 6th Avenue, Mount Vernon, NY 10550
82. 238 S 9th Avenue Mount Vernon, NY 10550
83. 240 S 9th Avenue Mount Vernon, NY 10550
84. 241 S 6th Avenue, Mount Vernon, NY 10550
85. 248 S 9th Avenue, Mount Vernon, NY 10550
86. 253 S 6th Avenue, Mount Vernon, NY 10550
87. 48 W 2nd Street, Mount Vernon, NY 10550
88. 56 W 2nd Street Mount Vernon, NY 10550
89. 62 W 2nd Street, Mount Vernon NY 10550
90. 64 W 4th Street, Mount Vernon, NY 10550
91. Mount Vernon UTEN Letter of Interest List of Signees

Commercial Building Profiles

92. Church of Saint John, Paul, and Clement
93. Doles Recreation Center

94. Ebony Gardens Apartments- Multifamily
95. Greater Centennial Homes- Multifamily
96. L.I.V.E Church
97. Macedonia Baptist Church
98. Mount Vernon Fire Department
99. Mount Vernon Neighborhood Health Center

100. Training Outline
101. Detailed Cost Estimate Breakdown
102. Note: The item is intentionally blank
103. Calculations for MV Subsidized Rates
104. UTEN Rate Design MV Cost-Based Rates
105. Energy Modeling Results
106. MV Rates
107. MV 1-4 Family Rates & Customer Protections
108. MV Large Customer Heating & Cooling Cost Protections
109. MV Customer Agreement
110. MV Customer Rights and Responsibilities
111. Life Cycle Cost Analysis
112. PSC Metrics
113. UTEN Monthly Reports - Combined
114. MV Response to Compliance Letter
115. Letters of Support
116. Term Sheets with City of Mount Vernon