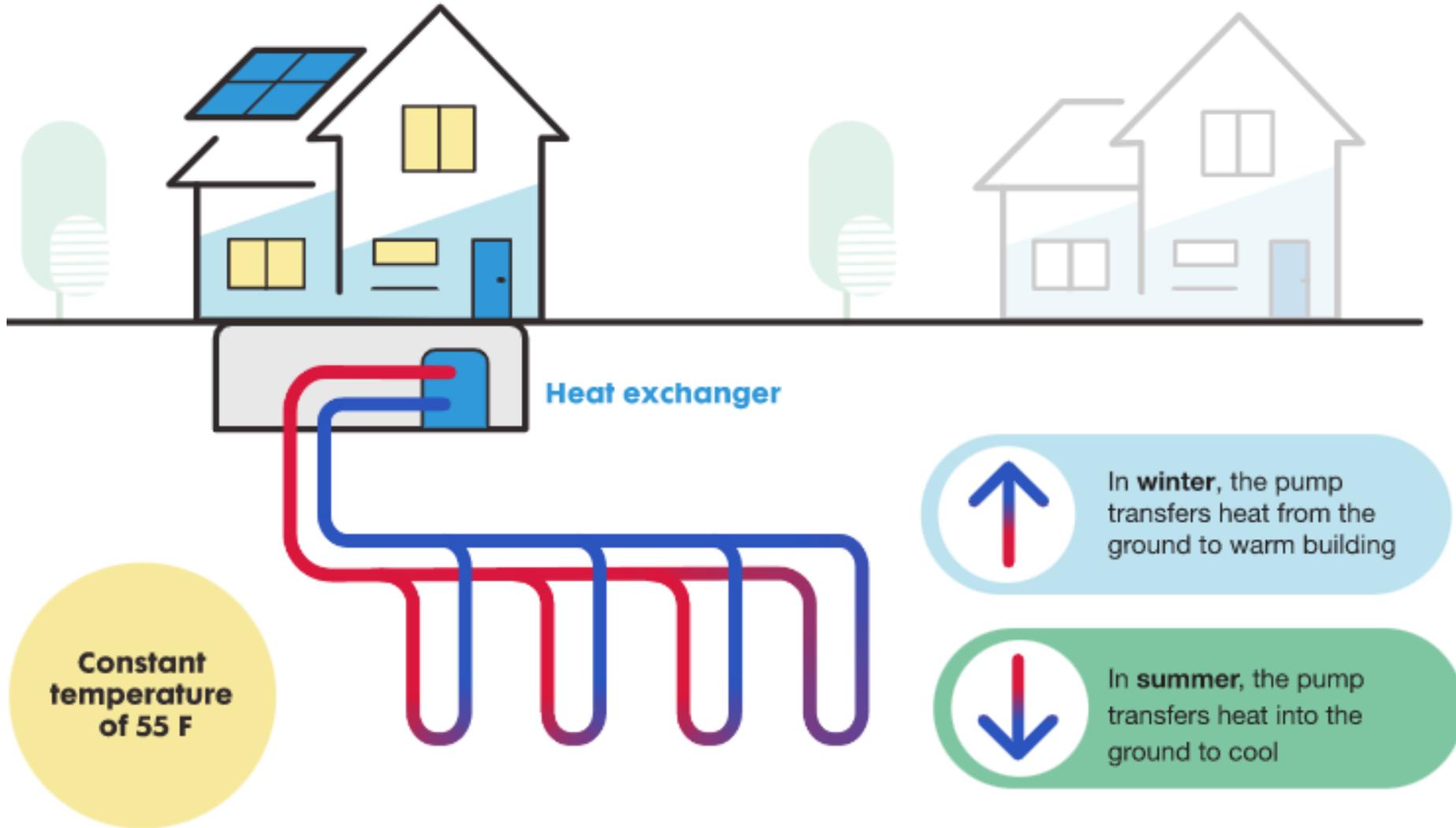


O&R Thermal Energy Network Pilots Program

Agenda

1. Ground Source Heat Pump (GSHP) System
2. GSHP vs Alternate Heating/Cooling Solutions
3. Thermal Energy Network Pilot Concept
4. Thermal Energy Network Pilot O&R/Developer Partnership
5. O&R Request for Information for Site Selection
6. Site Types
7. Overall Pilot Schedule

Ground Source Heat Pump System



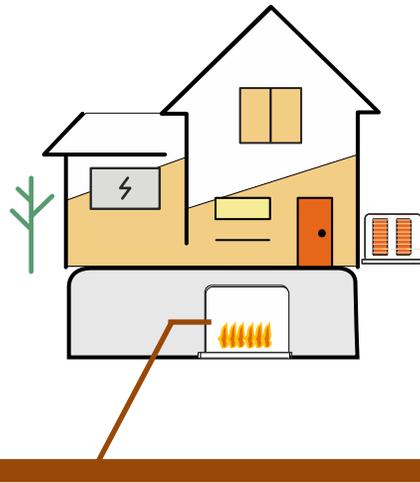
Orange & Rockland. <https://www.oru.com/en/save-money/rebates-incentives-credits/new-york-customers/incentives-for-residential-customers-ny/clean-heating-cooling-with-heat-pumps/heat-pump-equipment/save-on-geothermal>

GSHP vs Alternative Heating/Cooling Solutions

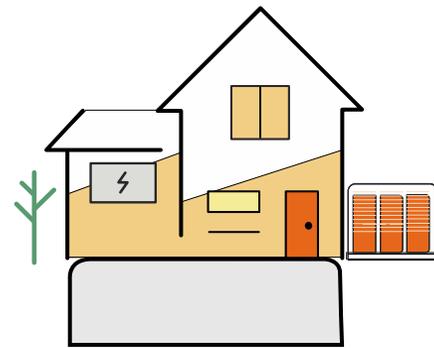
Cost Comparison for 2,000 sq-ft home

These are estimated average costs for illustrative purpose only. Actual cost may vary greatly for individual customers.

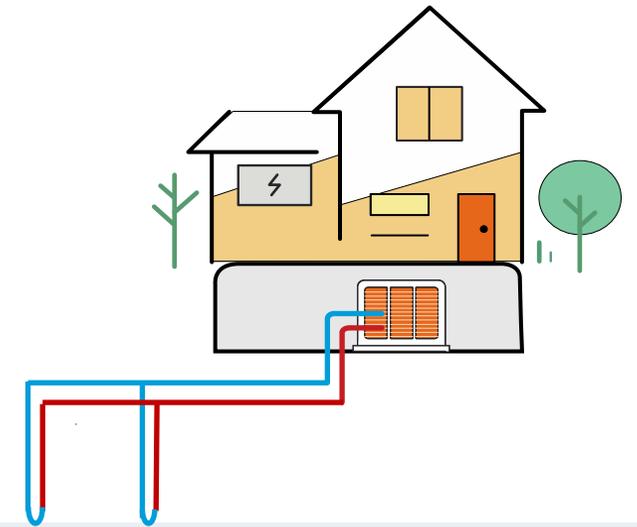
NG Furnace/Central Air



Cold Climate Air Source Heat Pump



GSHP (Heating/Cooling)



Installation Costs	~\$10,000	~\$16,000	~\$36,000 \$17,000 (GSHP) + \$19,000 (Ground Loop)
Annual Fuel Costs	~\$2,300 ~\$1,700 (heating) + ~\$600 (cooling)	~\$2,400 ~\$2,000 (heating) + ~\$400 (cooling)	\$1,600 ~\$1,300 (heating) + ~\$300 (cooling)
Annual GHG Emissions	~16,750 lbs	~10,000 lbs	~6,800 lbs

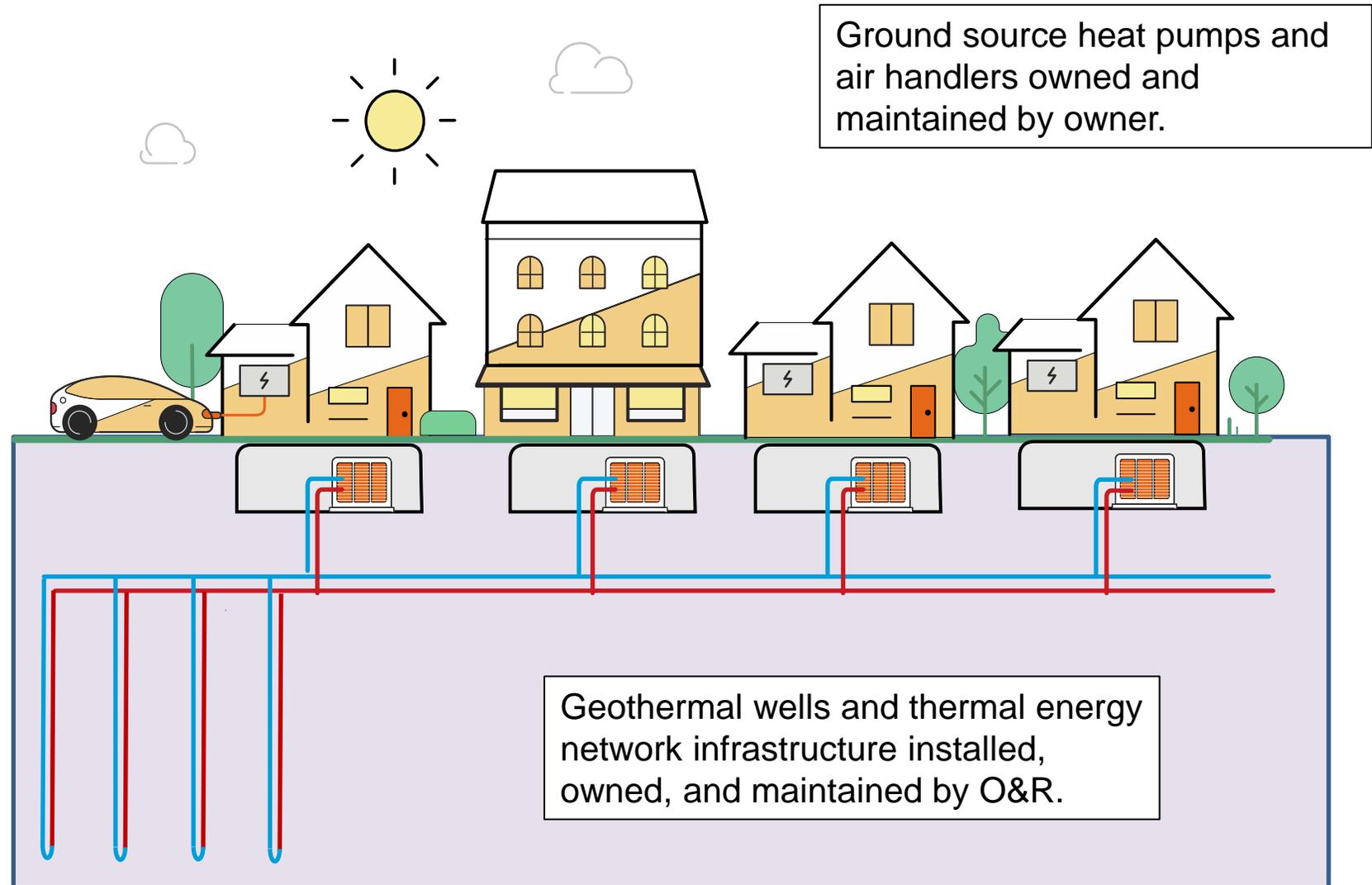
GSHP Advantages / Disadvantages

- **Heats/Cools more efficiently, producing operational savings:** Single equipment can deliver 3-5x energy they consume for heating and cooling, generating monthly operating cost savings
- **No Local Emissions:** No local combustion and local GHG emissions
- **Long Lasting, Proven Technology:** GSHPs have been in use since the late 1940s and have an effective useful life of 25 years
- **Water Heating Assist:** GSHP equipped with 'desuperheaters' can produce hot water by transferring excess heat to hot water tank
- **Enhanced Outdoor Aesthetic:** Eliminates the need for an outdoor AC unit, enhancing neighborhood appeal and eliminating the HVAC noise
- **Higher Installation Cost:** GSHP can be 3x more expensive to install than traditional HVAC systems

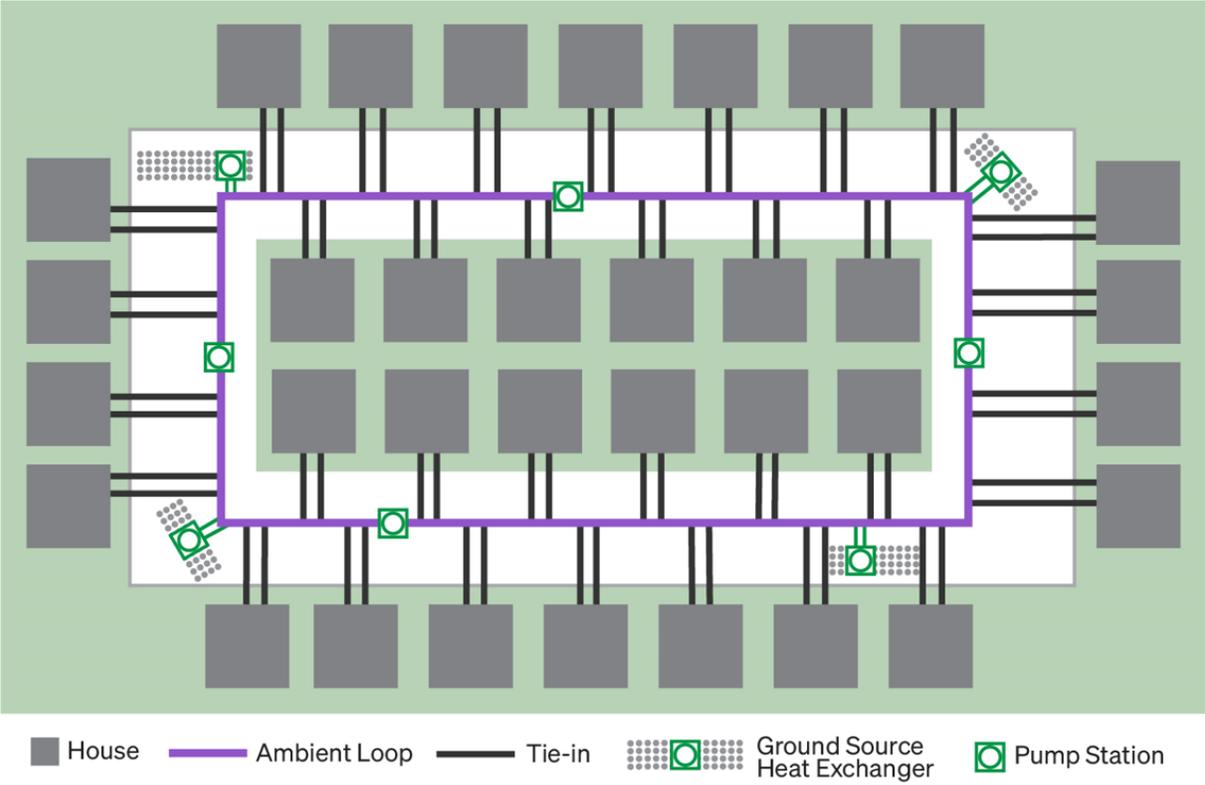
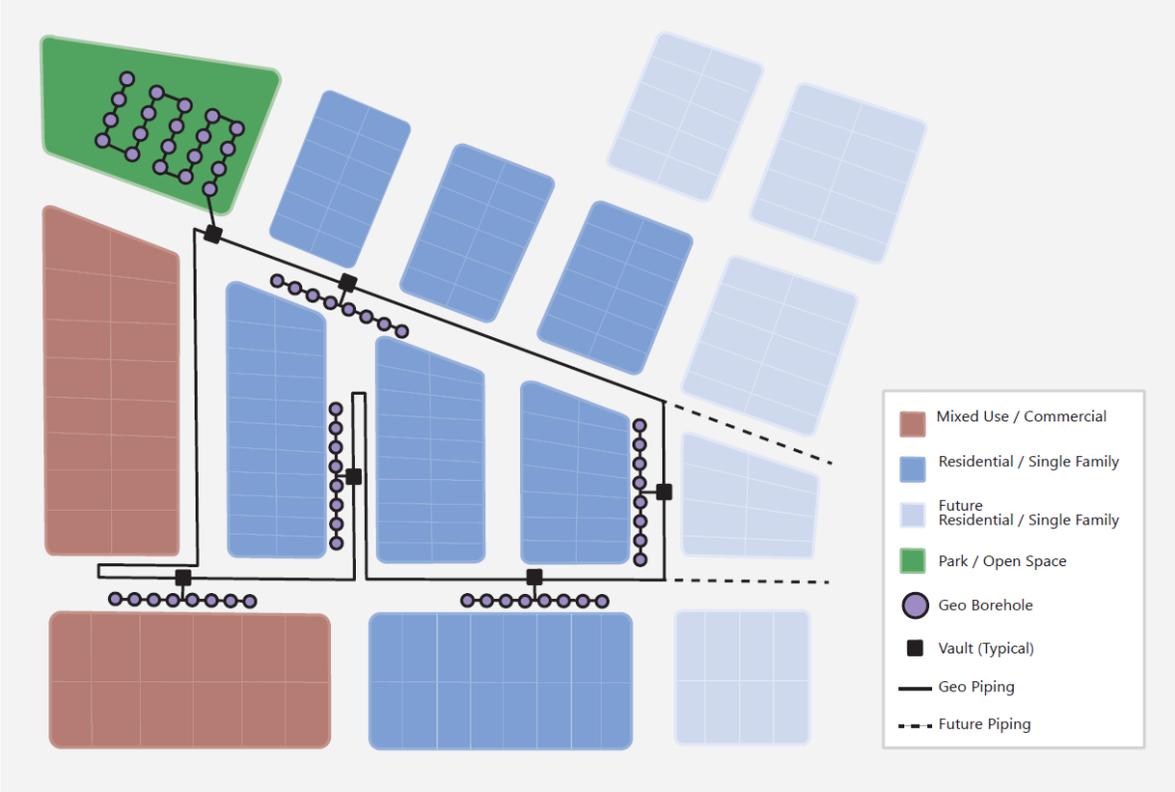
Thermal Energy Network (TEN) Pilot Concept

Same GSHP equipment but utilizing a shared TEN

- Maintains **all the advantages** of a customer-owned GSHP system
- Eliminates first cost hurdle; makes GSHP available to **all customer classes**
- Facilitates clean heat transition that is **scalable & equitable**
- TENs are likely **part of the solution** to meeting the state's clean energy goals
- Leverages utility experience in shared infrastructure, response time, reliability



Conceptual Schematics



TEN O&R/Developer Partnership

- O&R is looking for partners to locate sites for TEN pilots
- This venture provides an excellent opportunity for a community to install a cost-effective, low-carbon source of heating and cooling.
- Under this partnership, O&R will design, install, and maintain the geothermal wells and thermal energy network infrastructure up to customer property line.
- The customers will install and operate the HVAC system including the heat pumps and air handlers.
- O&R will work with customer on potential financial support for customer-owned equipment



O&R Request for Information (RFI) for Pilot Site Selection

- **O&R will release a RFI in mid-December.** The RFI requests interested parties to submit information on viable sites to be considered for O&R TEN pilots.
- **Who should apply?** Real estate developers, building owners, municipalities, and/or other interested parties (“Respondents”) who are interested in partnering with O&R for the development the pilots.
- **Key components** for submission
 - Map(s) or sketches delineating the proposed site/buildings;
 - Description of the surrounding area (if available);
 - Construction drawings for new or renovated buildings (if available); and
 - Letters of Support from local municipalities, building owners, or other partners (if available).
- Final approval of pilot projects will be at the discretion of the New York State Public Service Commission and is expected to come in the first half of 2023.

Site Types

1st Site Type

- New community development (i.e., greenfield) of high density, mixed-use development (e.g., homes, apartments and commercial buildings)
- Evaluate:
 - i. Financial and operational benefits to GSHP adoption;
 - ii. To extent TEN will encourage additional clean energy technology adoption; and
 - iii. The Company's engagement will streamline project approval(s).

2nd Site Type

- Retrofit installation in neighborhood with gas system benefits to phase customers off of the gas system (fully electrify) over time as they get familiar with GSHP system. Or new residential community where gas expansion is prohibitively expensive and fully electrifying these customers from the start.
- Potentially pair system with solar and storage for resilient local energy resource.

Additional proposal characteristics (applicable to both projects):

- Total cooling/ heating load for both pilots less than or equal to 1,100 tons
- Estimated necessary budget for both projects to be between \$22M and \$29M
- One project located in Disadvantaged Community (DAC): nysderda.ny.gov/ny/disadvantaged-communities

Preliminary Pilot Timeline

Key Milestones	*Timeframe (from site selection)
Site Selection	Jan-Feb, 2023
Feasibility Analysis and Preliminary Design	Feb-March , 2023
Submission of Proposed Project	March-April, 2023
PSC Approval of Proposed Projects	Q2 2023
Detailed Project Design	Q3 2023
Execution of Agreement with Selected Respondent and Connected Customers	Q3 2023
Construction Initiated	Q4 2023
Construction Completion	Q1 2024
Start-up & Commissioning	Q2 2024

Contact us:

If you have any questions about the RFI or would like to discuss the potential of a thermal energy network pilot at your site/community, please contact our team at:

GeothermalNeighborhood@oru.com



Orange & Rockland