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July 26, 2024

Network Geothermal Pilot Overview

Presentation to the Just Transition Working Group of the Maryland Climate Change Commission

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Networked Geothermal Energy Delivery System Overview

New Legislation paves the way for a new, clean heating solution for Marylanders

WARMTH Act Timelines

- 2024 Legislation (HB 0397) requires Gas utilities to conduct Networked Geothermal pilots
- Proposal due July 1, 2025, PSC decision by Dec 31, 2025
- Go-live 12 months after PSC approval, two years pilot period

Pilot Proposal Criteria

WARMTH Act sets specific requirements for the pilot:

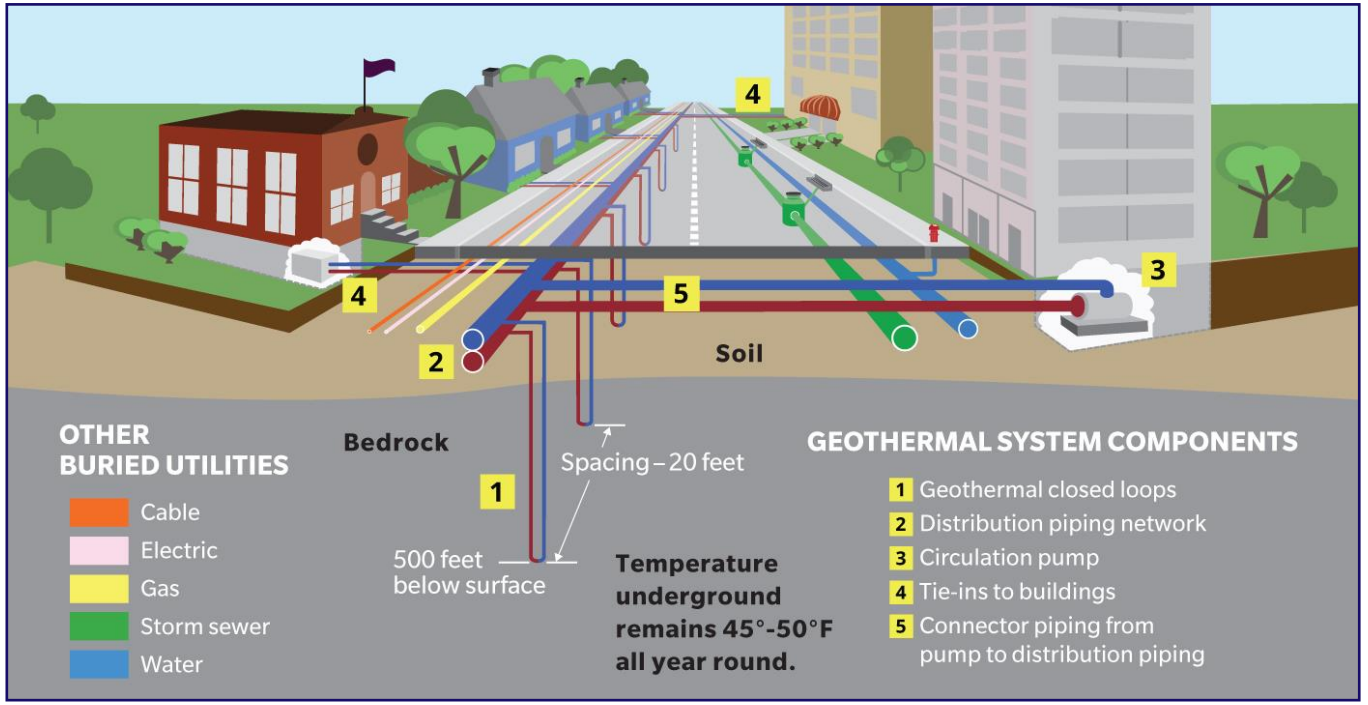
- 80% of participating customers must be LMI households
- Site must be served by gas today
- Pilot customers must pay less than energy costs today
- Specific workforce requirements

Evaluation Criteria

- Cost effectiveness, including avoided costs & societal cost
- Ability to acquire federal & state funding support
- Address: GHG reductions, EJ Communities, Safety, etc.
- Learnings to inform long-term potential of thermal energy networks

Engaging the Community

- BGE seeking 2 pilot locations
- Customers' new appliances will be paid for by pilot
- BGE will own appliances connected to thermal network, until tax credit expires
- Customers may opt-out



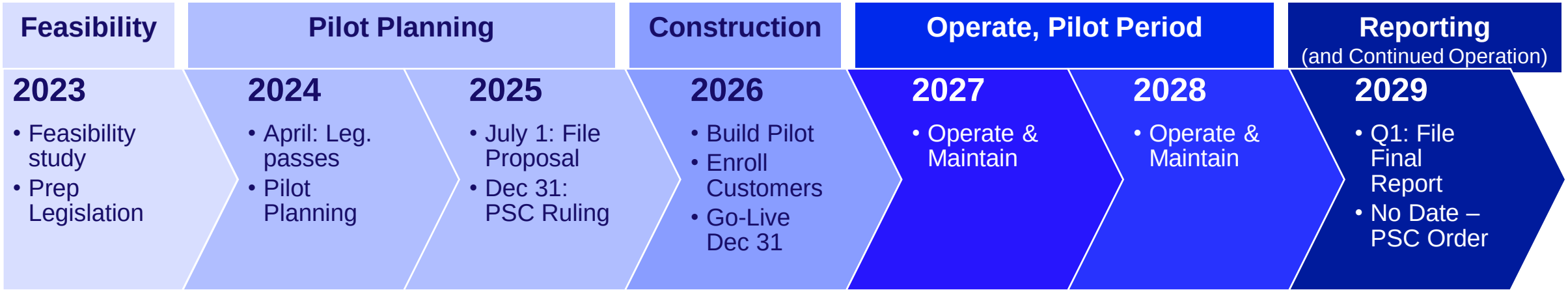
What is Networked Geothermal?

A networked energy delivery system where **several buildings**, each individually equipped with and electric-power **ground source heat hump (GSHP)**, are connected to a **shared network** of underground pipe which circulate relatively low-temperature working fluid to **transfer heat** between the ground and indoor spaces to be conditioned.

Visual Reference: Eversource.com

High-Level Pilot Timeline

Planning is underway for the 2-year pilot period. Engineering analysis is underway to develop a short-list of target communities, but this will not be complete until year-end.



NEAR-TERM TIMELINE FOR PILOT PROPOSAL DEVELOPMENT IN 2024-2025

1. **Now** - Onboarding engineering partner to identify potential pilot locations
   - Targeting preliminary list of locations by end of 2024
   - Will down-select by incorporating community feedback in Q1 2025

2. **October 1, 2024** - File planning notice with PSC – Case No. 9749
   - Seeking letters of support to incorporate in filing

3. **July 1, 2025** - File pilot proposal with PSC

Network Geothermal Pilot Project Launch

BGE's Efforts to Develop the Pilot are Underway

- Initial BGE Feasibility Study complete in 2023
- HB397 signed by Governor Moore
- Internal BGE project teams created
- Milestone Project schedule developed
- RFP completed and engineering partner selected for Site Selection analysis
- Initial external pilot socialization underway

Delegate Lorig Charkudian's Signing Cake

2023’s Feasibility Study Key Findings

A feasibility study was performed in 2023 in preparation of a potential pilot, with the objective of understanding the network geothermal technology to enable future work

Feasibility Study Results:

1. **Technical viability** ☑
   - Geologically feasible viability across majority of the BGE's service territory
2. **System and cost impacts** ☑
   - Preliminary estimates positive, but will be informed by the pilot findings
   - Est. up to 70% of electric peak reductions
   - Est. up to 50% of energy savings
   - Est. up to 60% of GHG emission reductions
   - Costs are 2 to 3x ASHPs with IRA incentives, not reflecting the avoided T&D investments and GHG emissions, and the State and local incentives.
3. **Importance of thermal balance**
   - Mixed-use customers provide the best thermal balance
   - Pilot demographic constraints may impact network efficiencies due to potential thermal imbalance

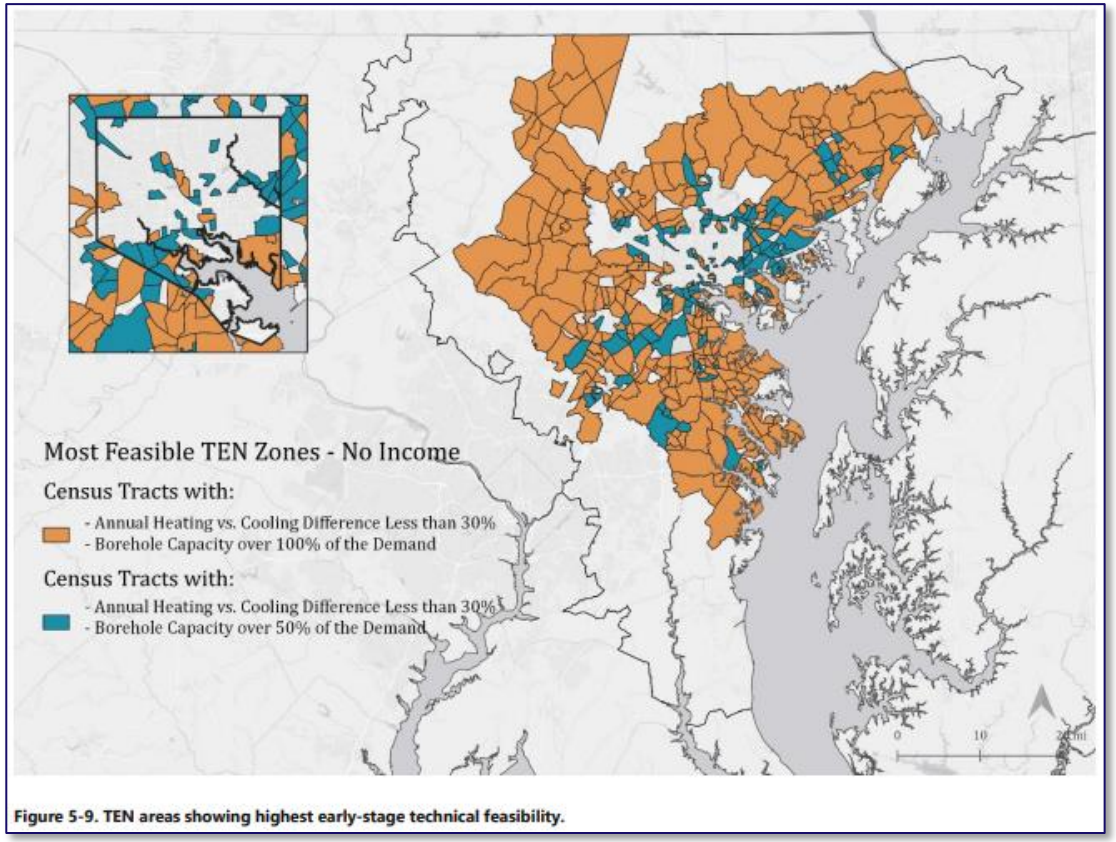


Figure 5-9. TEN areas showing highest early-stage technical feasibility.

Networked Geothermal Pilot Benefits

Customer Benefits:

- Reduced heating and cooling costs – Up to 45% energy savings vs ASHP
  - Reasonable insurances pilot customers will not pay more for energy
- Utility provides heating and cooling equipment conversions
- Equipment maintenance provided for duration of the pilot
- Utility provided energy efficiency upgrades-insulation, duct work, air sealing
- Low carbon source of heating and cooling
  - Up to 62% emissions reductions vs traditional HVAC
- Reduced indoor noise levels from appliances
- Increase comfort

BGE as Strategic Implementation Partner

- Existing trust and access to customers
- Institutional knowledge of underground pipe network operations
- Overlapping gas & electric services
- Real estate & right-of-way
- Gas workforce
- Represented workforce
- Billing & metering expertise
- Customer adoption programs (EmPower)
- Electric distribution system
- Established communication system

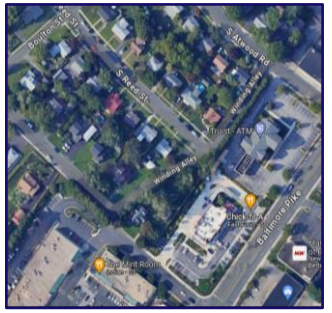
APPENDIX REFERENCE: Prototype Street Segments (PSSs) Selection

- 5 Prototype Street Segments (PSSs) representative of BGE service territory were selected and assessed for network geothermal system design
- Explore how variables such as house density, low income use patterns – paired with commercial establishments and/or waste heat capture opportunities could be modeled and repeated across Maryland. PSS were based on areas determined to be technically, and prioritized neighborhoods with low-income customers (household income below 80% of median across Maryland).

Low-density residential

Medium-density residential

High-density residential



High-density mixed use

Waste heat capture

	PSS 1: Low-density Residential	PSS 2: Medium-density Residential	PSS 3: High-density Residential	PSS 4: High-density Mixed Use	PSS 5: WWTP Waste Heat Capture
Number of Buildings	44 residential (~1,000 square feet each)	42 residential (~1,300 square feet each)	46 residential (~1,200 square feet each)	23 residential 5 commercial	4,762 residential 155 commercial
Length of Road Network	700 feet	500 feet	375 feet	2,200 feet	70 miles
Priority Zone (i.e., Low-income)	No	Yes	Yes	Yes	No
Existing HVAC System	Gas furnace and split system air conditioning	Gas furnace and split system air conditioning	Gas furnace and window-box air conditioning	Gas furnace and split system air conditioning (residential) Rooftop units (commercial)	Gas furnace and split system air conditioning (residential and commercial)