



The Utility of a Utility

Moderator:

Morgan Hood / *Vermont Gas Service*

Panel:

Andreas Thanos / *NARUC (video)*

Holly Braun / *NW Natural*

Owen Brady-Traczyk / *National Grid*

Nikki Bruno / *Eversource Energy*

*Presented Live at the
NY-GEO 2023
Conference
Albany, New York on
April 27, 2023*

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The Birth of Thermal Utilities: The Utility of a Utility

*Moderated by Morgan Hood,
Vermont Gas*



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WINSLOW
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Andreas Thanos

National Association of Regulatory
Utility Commissioners (NARUC)

Role of Utilities

- Responsibility to investors
- *****Responsibility to Consumers*****
- Responsibility to abide by State and Federal Laws

Holly Braun

NW Natural

Utility Geo-Transition Pathway Challenges & Opportunities

April 27, 2023
NY-Geo, Albany, NY
Holly Braun, Energy Innovation Consultant, NW Natural



Gas-to-Geo Hurdles

Just to get started:

- Corporate Identity
- Business Model
- Rate design
- Regulatory approval

Once you're moving:

- Determining study locations
- Workforce availability



Work together to more quickly and soundly solve for:

1. Business model and rate structure that are consistent/congruent with the utility investment profile
2. How to ascertain the best sites
3. How to physically go about doing one of these projects
4. Resources in this space
5. How we can work with the other geo coalitions
6. Regulation needed to accelerate adoption
7. How to access the funding mechanisms outside utility rates



NW Natural



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UNGC Kickoff Roundtable 12/2022

Stage	Headwinds	Tailwinds
Curious	<ul style="list-style-type: none"> • Anti-gas/anti-gas utility sentiments • Complexity of NetGeo • Lack of helpful policy 	<ul style="list-style-type: none"> • Industry progress • The logic of gas to geo
Researching	<ul style="list-style-type: none"> • Understanding/creating the biz case • Potentially helpful policy but lacking specific directive or demonstrated geo application • Lack of internal capacity and consistent understanding of geo 	<ul style="list-style-type: none"> • Potentially helpful policy • Conceptually seen as a great solution to GHG/political challenges
Pilots submitted	<ul style="list-style-type: none"> • Determining where netgeo makes sense- feasibility studies expensive- can't do everywhere 	<ul style="list-style-type: none"> • NY Order requiring pilot submissions – creates clarity and reduces utility risk
Pilots underway	<ul style="list-style-type: none"> • Workforce availability: designers, drillers • Some municipal permitting 	<ul style="list-style-type: none"> • Customers and jurisdictions lining up to be included in studies and installations



Let's create the future we imagine.

Owen Brady-Traczyk

National Grid

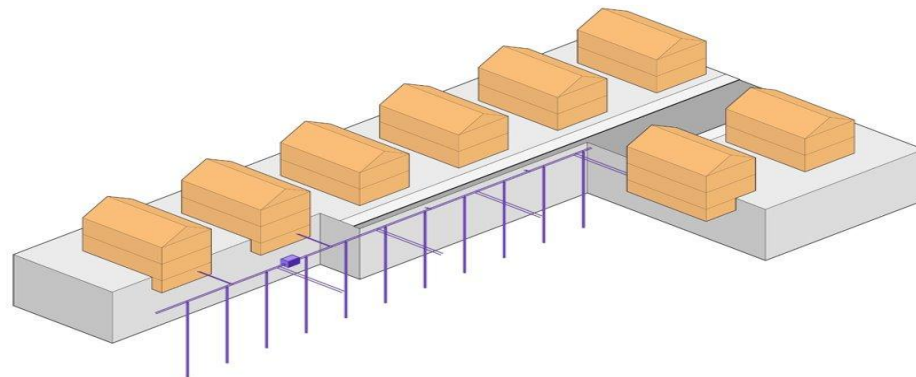
Thermal Energy Networks How do we scale?

April 2023

nationalgrid



What is a Thermal Energy Network?



Customers

In-building conversion cost and disruption will be similar in all electrification scenarios

Distribution Infrastructure

(horizontal pipes, pumping, etc.)

Similar to installation/ replacement of gas main, though exact system design and features (e.g. pipe diameter, depth) are likely to vary

Thermal Resource

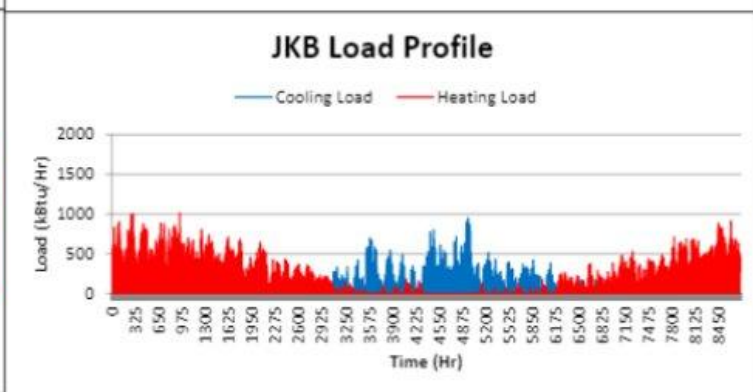
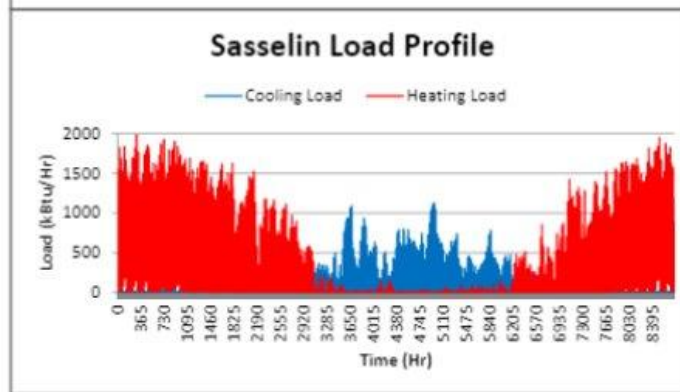
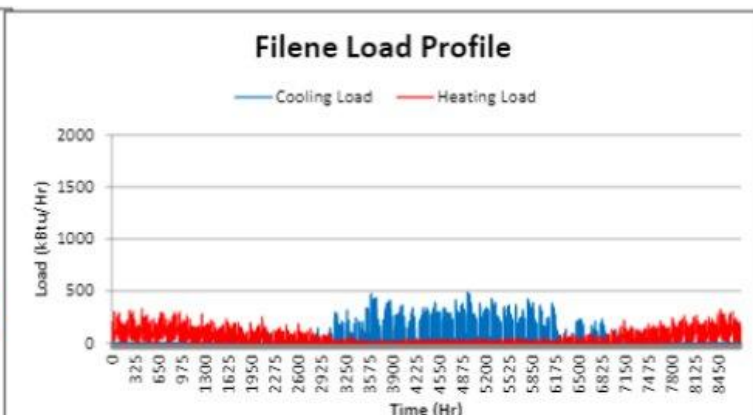
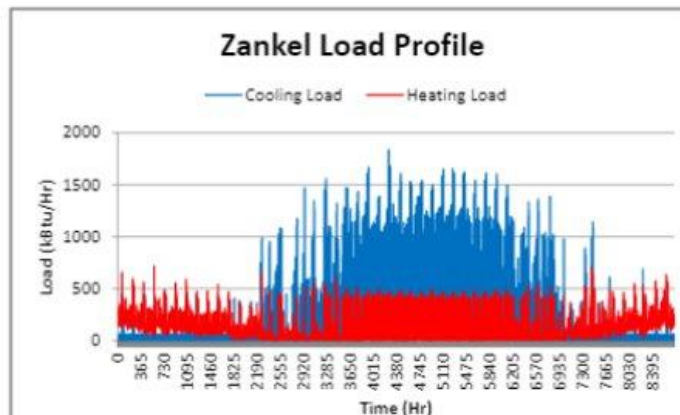
(e.g. geexchange from boreholes, wastewater)

Likely to be complex and resource intensive to develop but create significant long-term value

Individual Building Profiles – Arts Quad Node



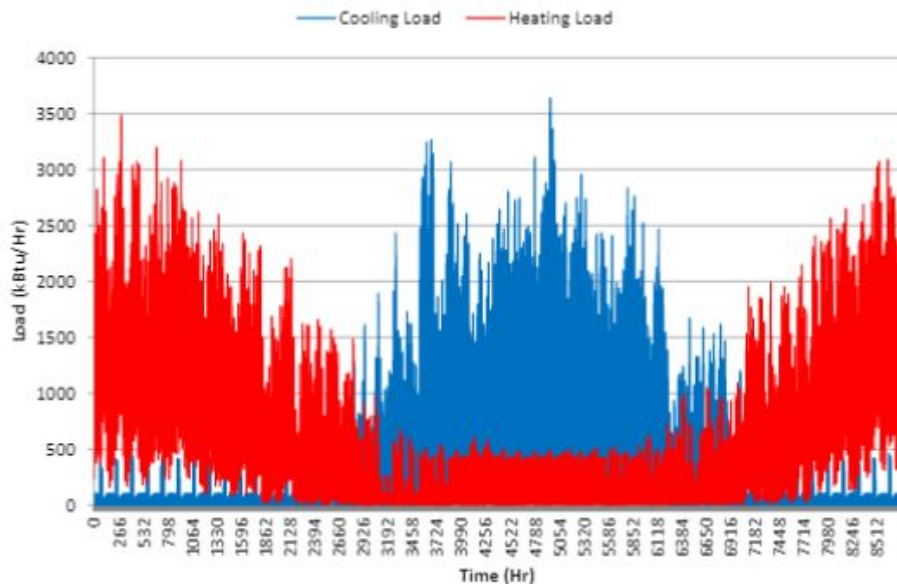
Skidmore College
Saratoga Springs, NY



Combined Building Profiles – Arts Quad Node



Arts Quad Load Profile



Loop Field Size Savings -Art Node

	# of Loops	Depth	Total Length
Zankel	35	500	17,500
Sasselin	60	500	30,000
JKB	32	500	16,000
Filene	9	500	4,500
Total	136		
Combined Loads	102	500	51,000

25 % Reduction in Loops

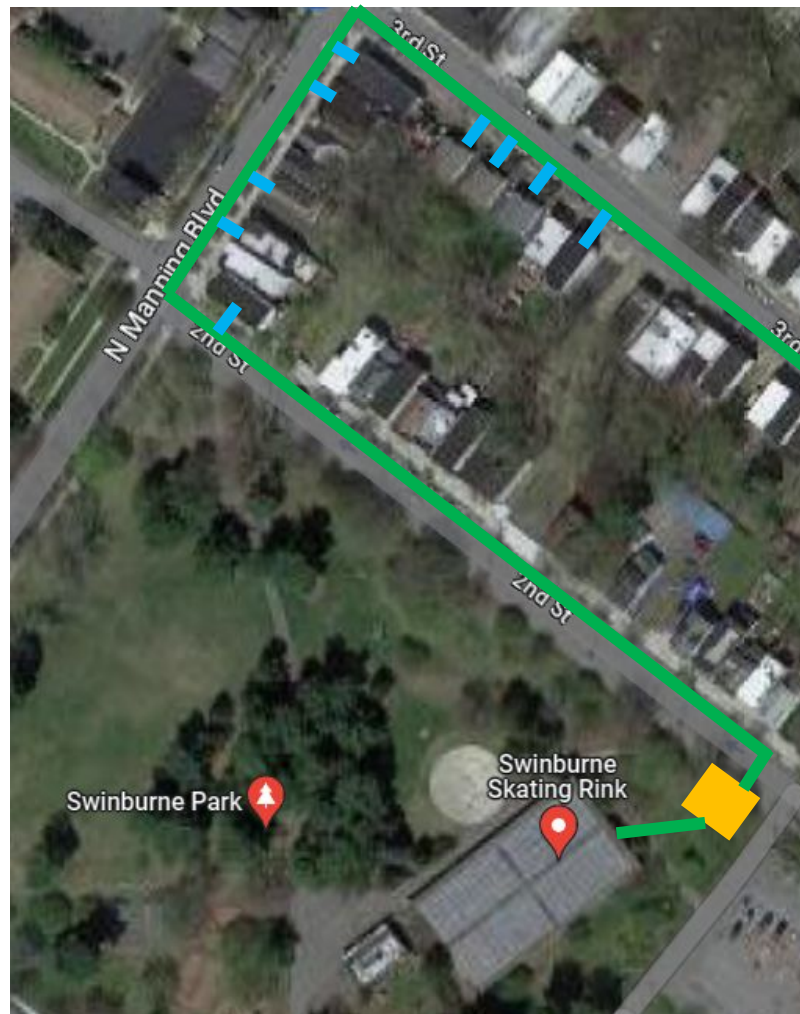
Opportunities to Scale - Example

- Customers are not identical so conversion all at once is difficult
- Options need to be available when customers are ready to convert



Opportunities to Scale - Example

- Thermal resources can serve as foundation for systems
 - Are likely to be more complex and/or take longer than other parts of the system
- Focusing on the distribution infrastructure first allows customers to connect when they are ready, even if thermal resources aren't
 - Heaters and chillers could be added in pumphouses to condition fluid



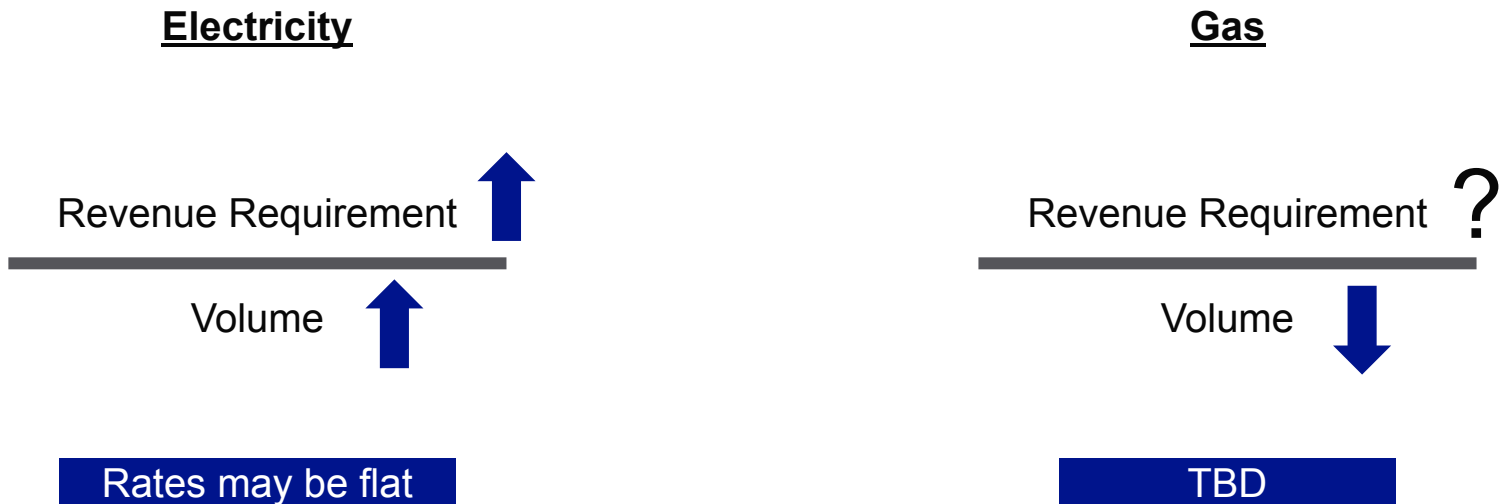
Gas vs Electric Utilities – Simplified Cost Implications

$$\frac{\text{Revenue Requirement}}{\text{Forecast Volume}} = \text{Cost per Unit Volume (e.g. \$/kWh)}$$

- Formula above only describes cost per unit, not total amount paid by customers (i.e. cost per unit volume multiplied by volume consumed)
 - We must be mindful of both types of costs during the energy transition
- Increasing the Revenue Requirement, such as through investment in infrastructure, will increase cost per unit volume
 - UNLESS it is accompanied by a corresponding increase in volume
- Increasing the volume sold, such as through conversion of end uses (e.g. electrification), will decrease cost per unit volume
 - UNLESS it is accompanied by a corresponding increase in the revenue requirement

Gas or Electric Utility Ownership – Hypothetical Cost Implications

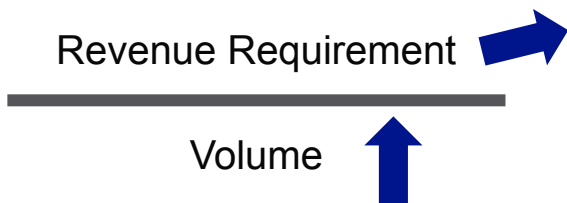
In a scenario where end uses are being electrified and additional assets, including geothermal assets, are added to the electric rate base:



Gas or Electric Utility Ownership – Hypothetical Cost Implications

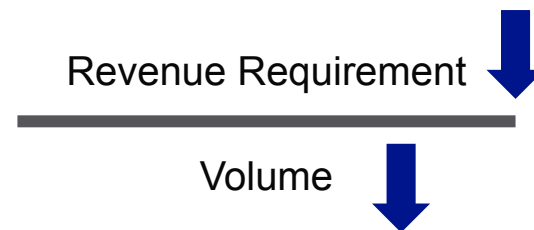
If gas utilities install networked geothermal to serve gas customers AND is able to retire gas assets:

Electricity



Rates may decrease

Gas (non-geothermal assets)



Rates may be flat

Gas or Electric Utility Ownership – Hypothetical Cost Implications

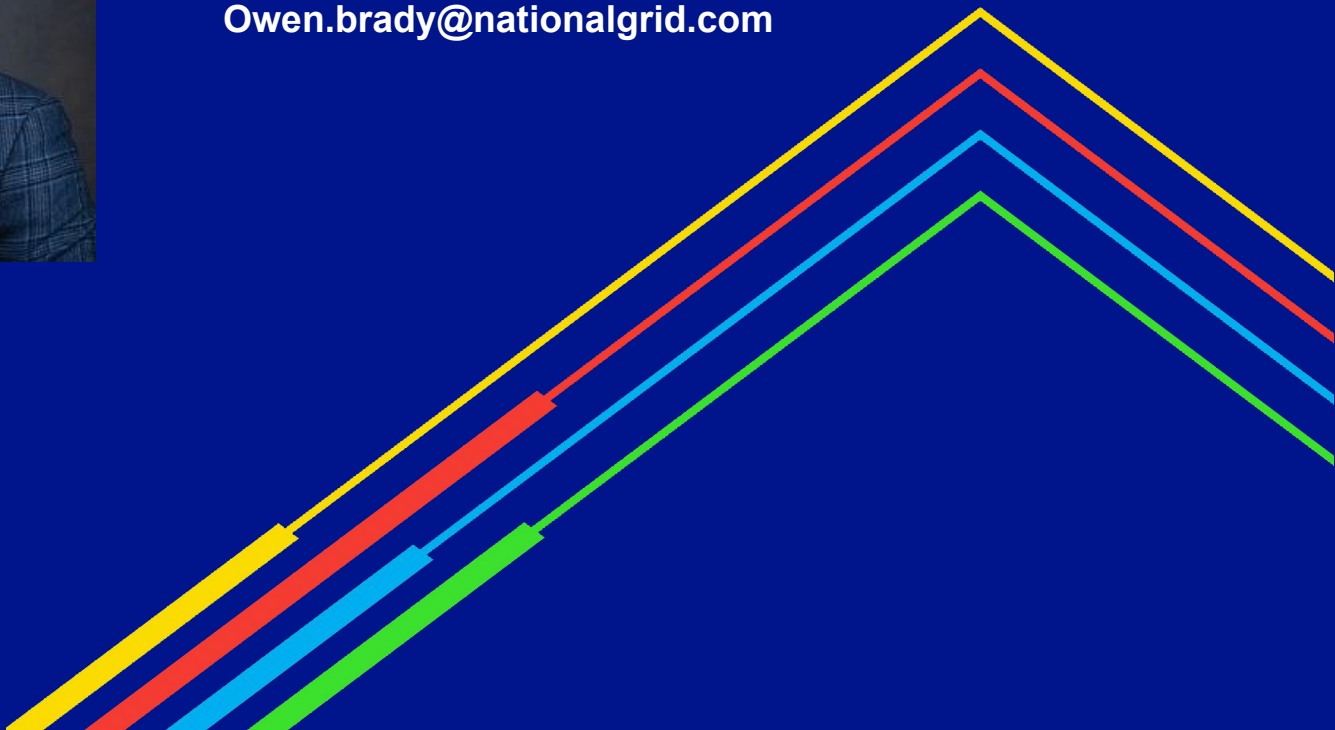
- The total cost for networked geothermal may be the same regardless of ownership but the rate impact may differ
- Gas utilities:
 - have expertise relating to installing and maintaining pipe networks
 - have a workforce that could easily install distribution infrastructure
 - may be able to coordinate installation of networked geothermal piping either co-located or in lieu of pipe being replaced (i.e. NPA)



Owen Brady-Traczyk

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Nikki Bruno

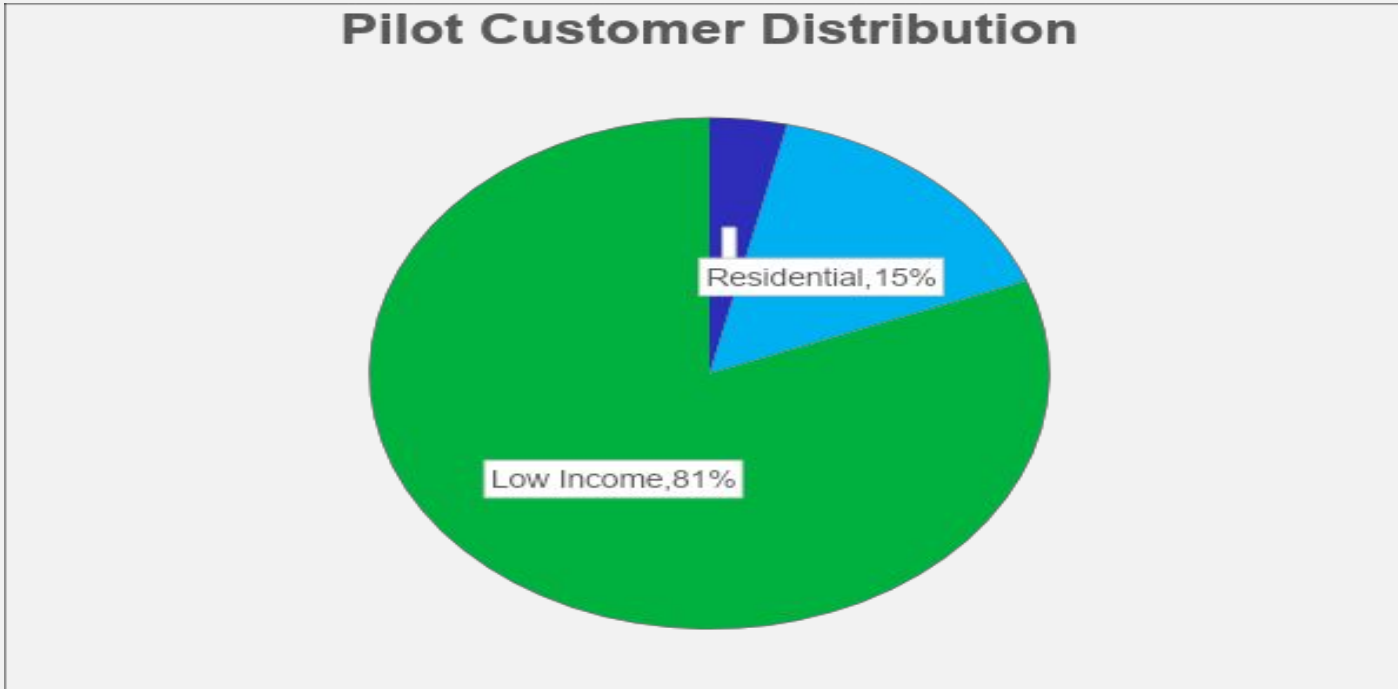
Eversource Gas



Eversource Networked Geothermal and Equity

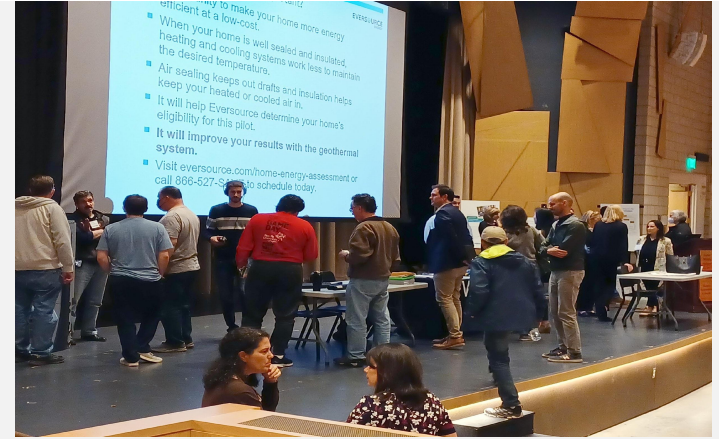
Customer Overview

- Customer distribution has a strong focus on low-income residents in the neighborhood
- Subsidized housing as well as city owned properties are included on the route



Stakeholder Outreach

- Strong focus on equity and inclusion during outreach efforts
- Informational material translations, interpreter, and engagement with the city to ensure all members of the community can participate
- External events such as Introduce a Girl to Engineering and Science and Earth Day.
- Ongoing support plan for the community through construction and operations



Pathways Forward

- Environmental justice community developments
- Energy efficiency upgrades
- Integrated planning build-out
- Additional clean energy projects

Questions?

info@heet.org | gastogeo.wiki | heet.org

Join us! Champagne &
signing of the **Declaration of
Thermalification!**

5:00 PM, Empire Room