



MIT Environmental  
Solutions Initiative

# How Geothermal Energy Networks (GENs) Can Meet Environmental Justice Priorities

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# Overview

- An EJ Framework
- Review EJ Concerns with existing gas networks
- How GENs Can Meet EJ Priorities
- Next Steps for EJ and GENs

# Defining Environmental Justice

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Foundations, definitions and theory

# What is Environmental Justice?

- The (modern) Environmental Justice (EJ) Movement began in the early 1980s as communities of color protested the inequitable distribution of pollution in their communities.
- This led to two landmark reports:
  - Siting of Hazardous Waste Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities (General Accounting Office, 1983)
  - Toxic Waste in the United States (United Church of Christ, 1987) - this report coined the term "environmental racism"



Protestors block the delivery of toxic PCB waste to a landfill in Afton, North Carolina, 1982. Credit: Ricky Stilley. Retrieved from <https://www.nrdc.org/stories/environmental-justice-movement>

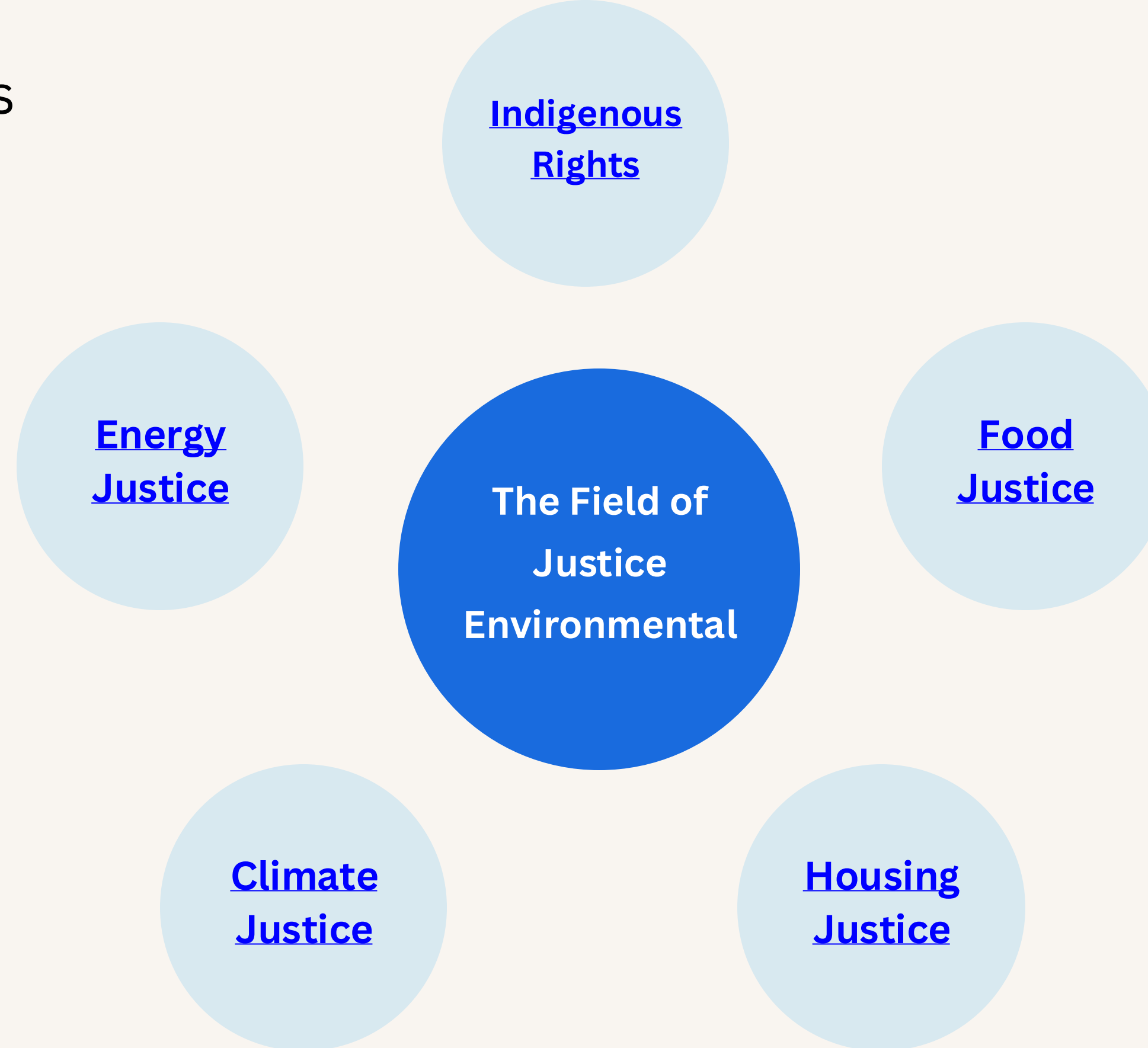
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## EPA and Environmental Justice

- Environmental Justice is the fair treatment and right to safe environment for all people regardless of social identity.
- See also Critical Environmental Justice (Pellow 2016)

These movements  
led to the EJ field  
with various sub  
areas

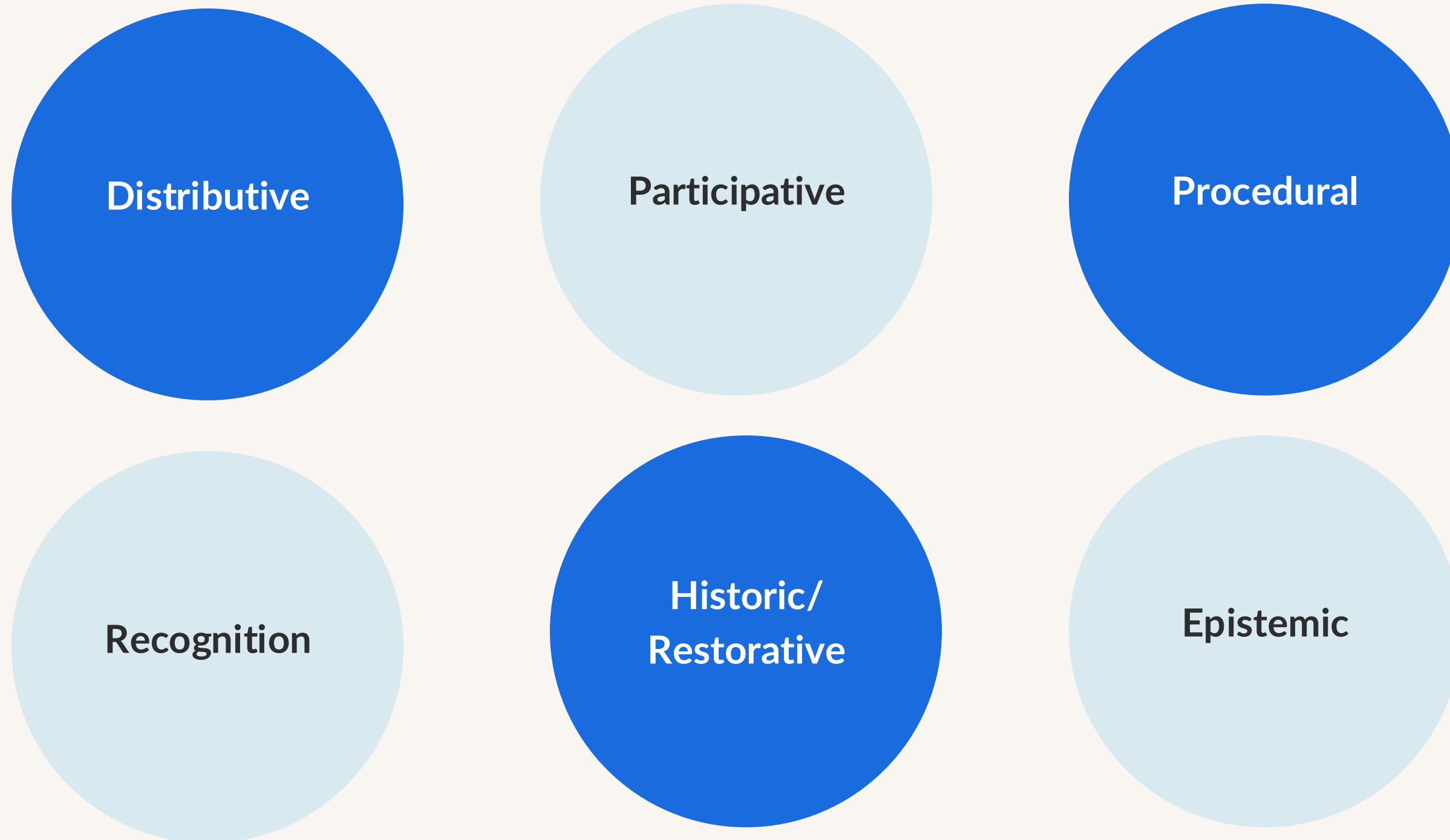
Expanded in both  
depth, breadth &  
methodology

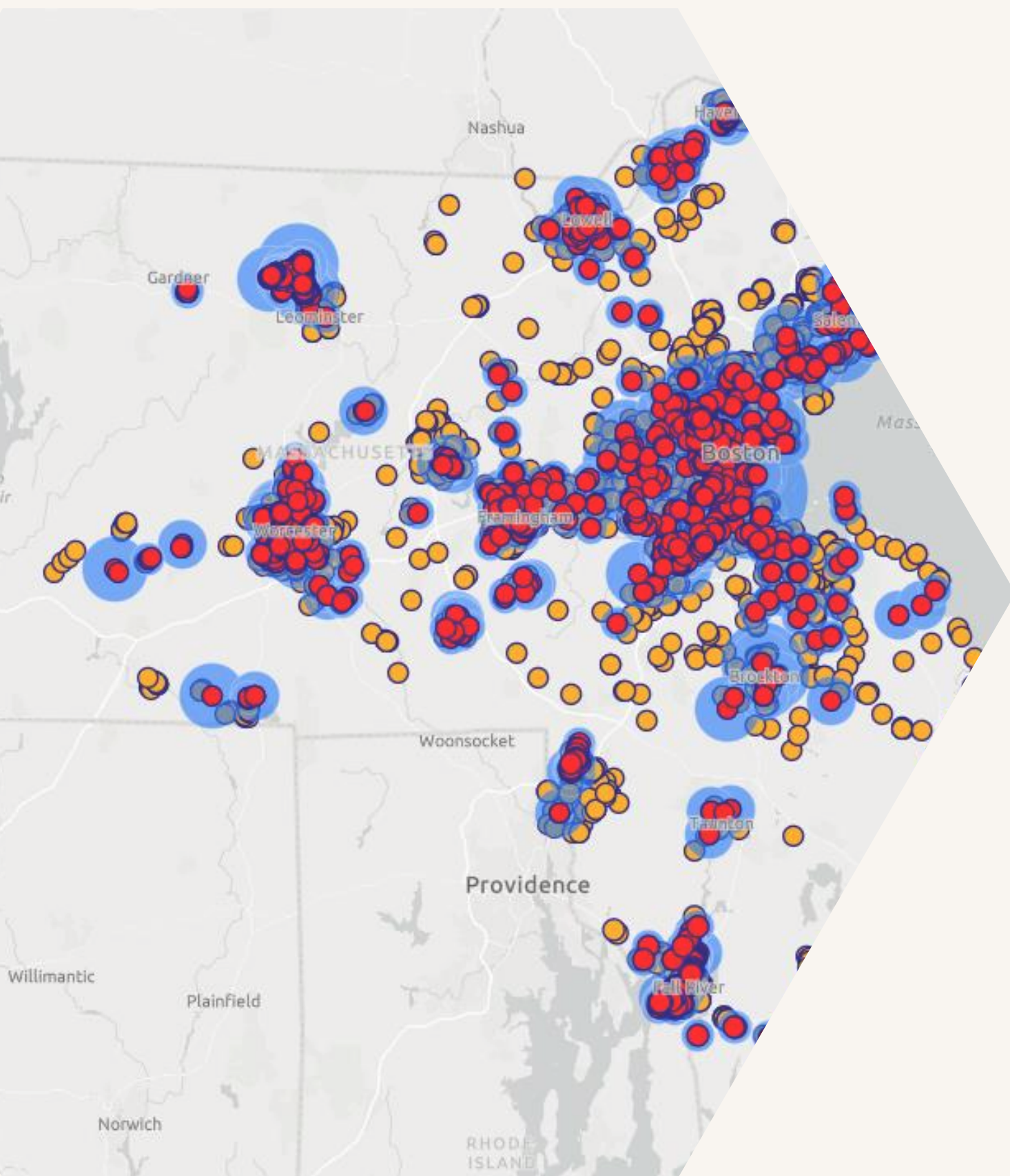


Helped redefine  
the environment

Continues to  
theorize “justice”  
and “equity”

# Theory: Conceptualizing Justice





# What are some EJ concerns in the Energy Transition in relation to GENs?

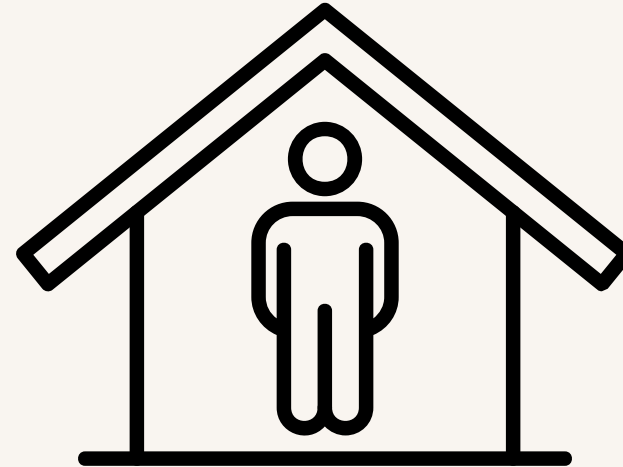
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# EJ Concerns with Heating and Cooling (Renewable Energy Transition)

Camargo et al.  
2024



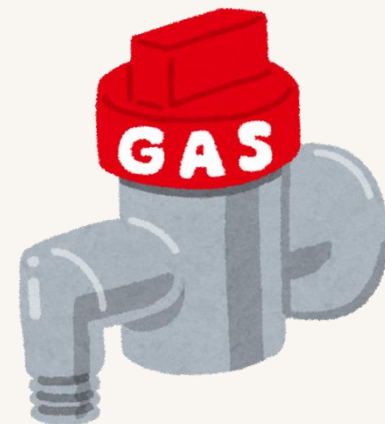
Buildings Account for 30%  
of US Emissions; (1/2) from  
On-site Combustion



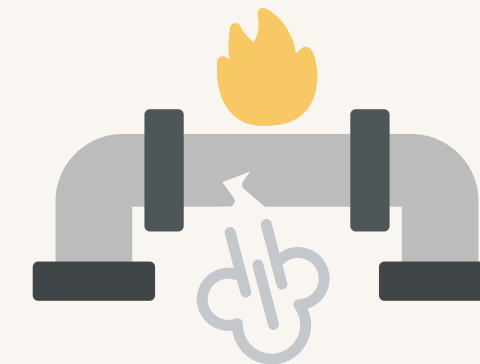
Individual Home Market Model  
for Residential Energy Change;  
Exacerbates inequity



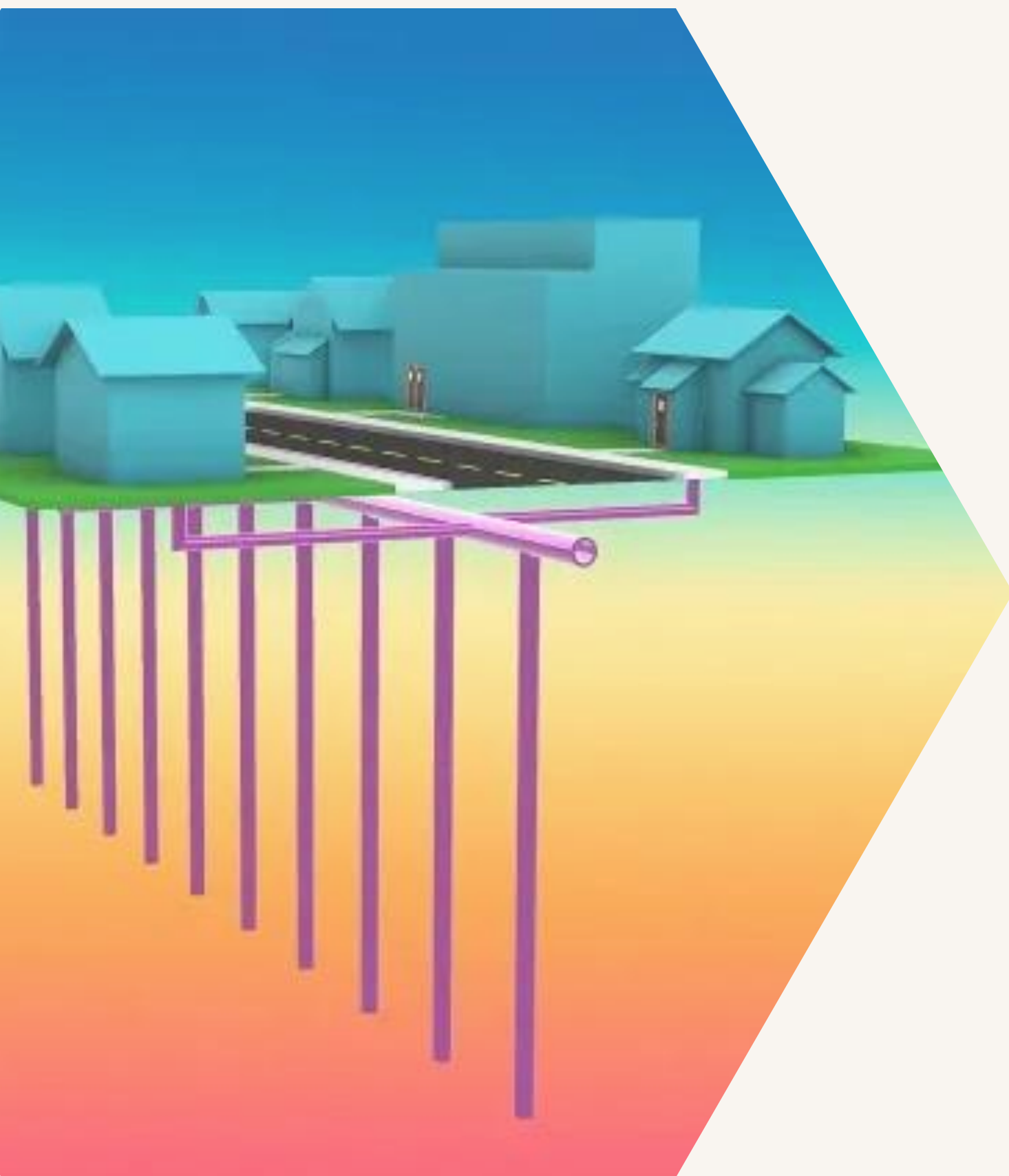
Gas Customer-Base Goes Down:  
\*Double the economic burden  
on low-income families by 2050



Declining Rate Payer Leaves Gas  
Utilities Vulnerable in Shift



Gas Leaks: 16,000 in MA; Poses  
safety & Logistical Challenges



# How Can Geothermal Energy Networks (GENs) Meet EJ Priorities?

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# Massive Reduction in Emissions & Increased Affordability



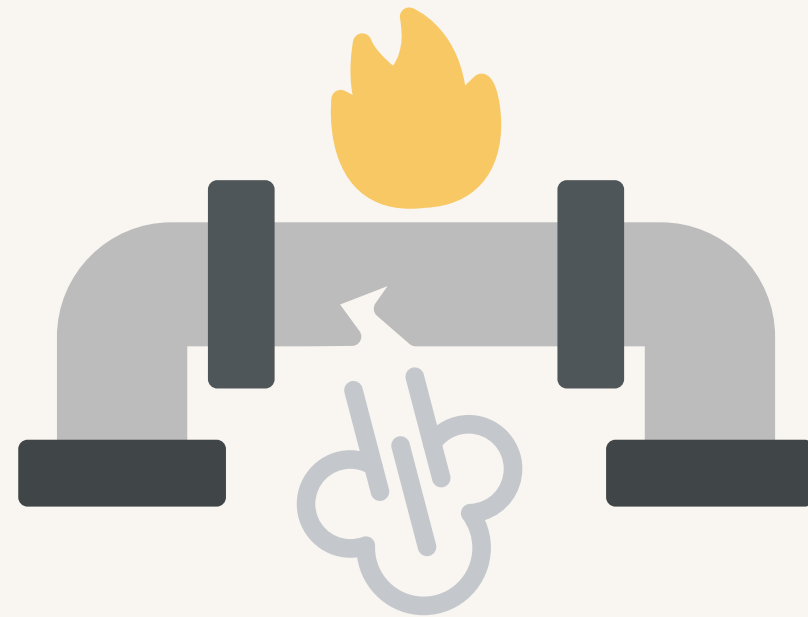
Colorado Mesa University's geothermal network has reduced campus emissions by 17,742 tons of CO<sub>2</sub> each year (Colorado Mesa University, n.d.)



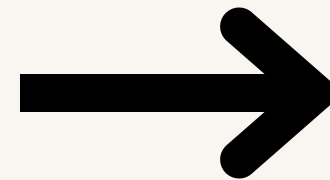
- GENs can allow for 195 million in savings over 30 years (Anderson, 2022);
- Increased energy efficiency - less peak demand on grid; significant savings

# From Gas to Geo: Safe and Healthy Transition

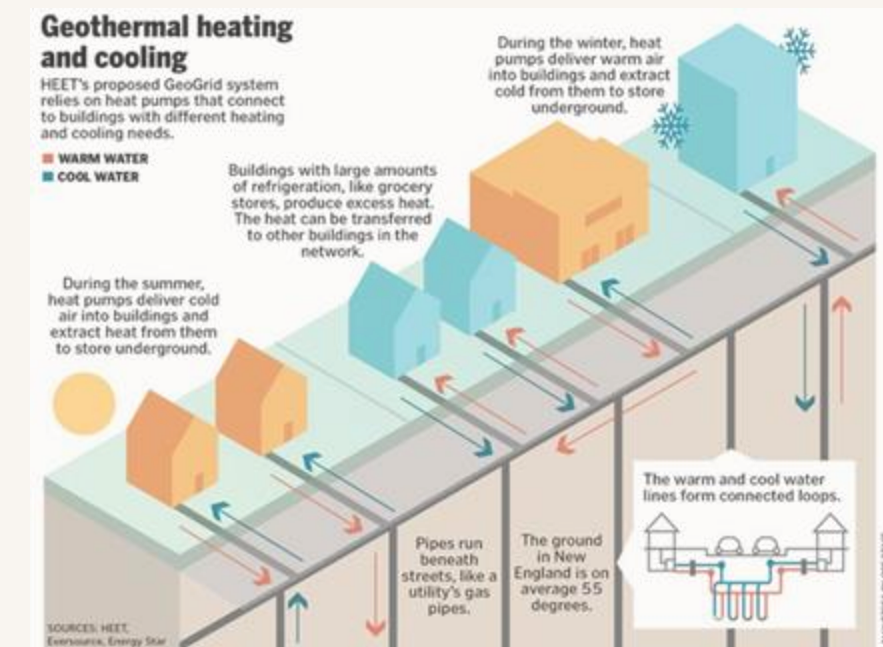
Gas



Old Gas Pipe Infrastructure:  
3 million miles of gas pipe in  
the US (Sevier, 2023).



GENs



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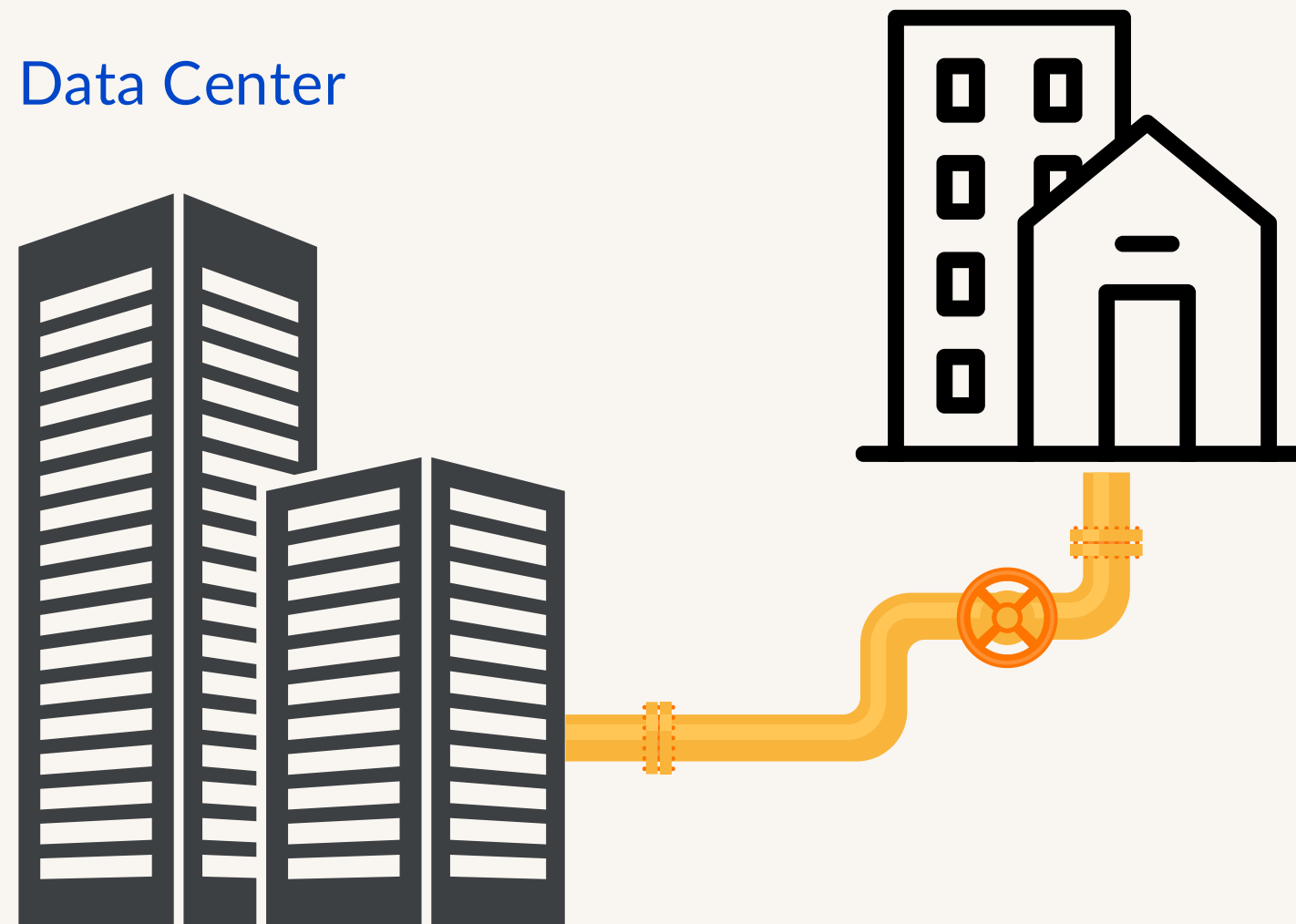
Safe, healthy, reliable heating & cooling:  
better model for gas utilities; can better  
address urban heat islands

# Equitable Distribution and Sharing of Energy Resources

Chelsea, NY

Public Housing Community

Data Center



(Consolidated Edison Company of New York, Inc. 2023).

Dorchester, MA

## Boston Housing Authority, National Grid team up on geothermal project in Dorchester

The project could be a test case for other sites in Boston, and elsewhere in the state

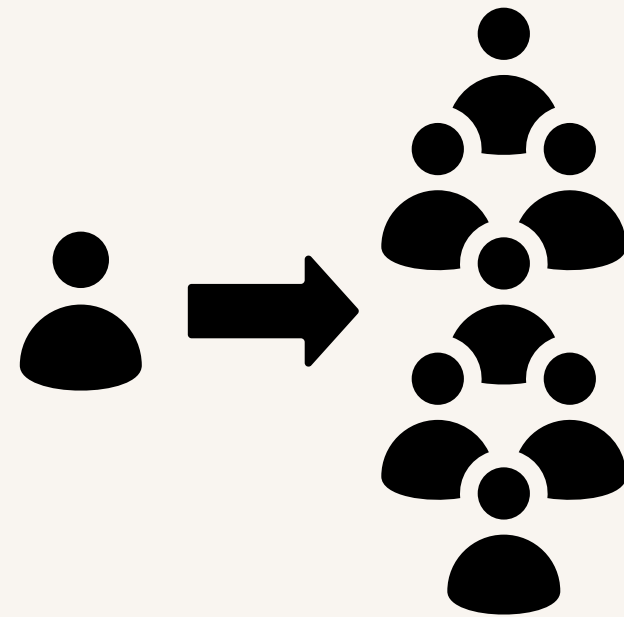
By Jon Chesto Globe Staff, Updated January 25, 2024, 11:01 a.m.



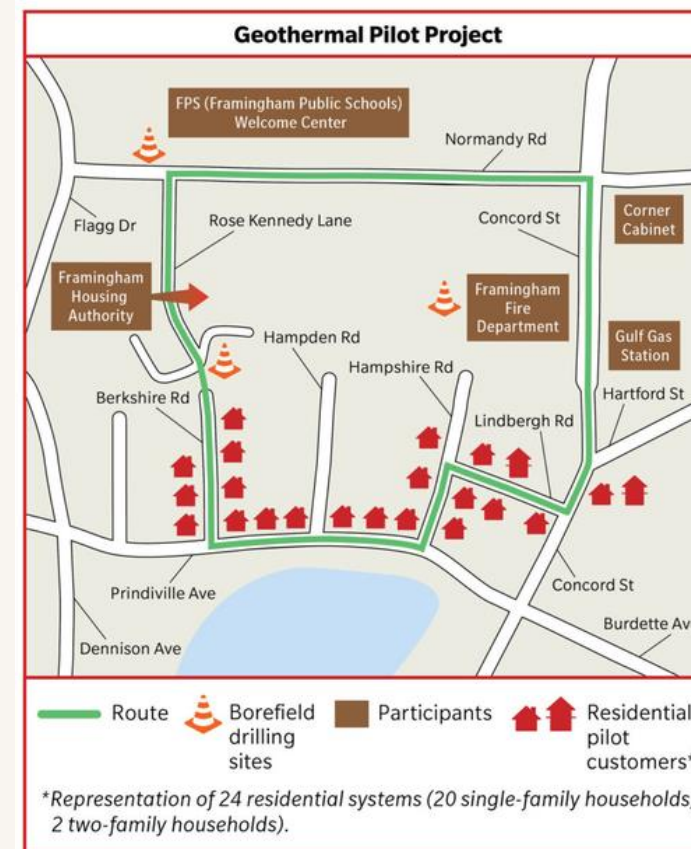
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**Prioritize EJ communities** - “heating and cooling to every building on the network regardless of the residents’ income level or homeownership status” (Camargo et al. 2024, p.6)

# Equitable Community Participation & Decision Making

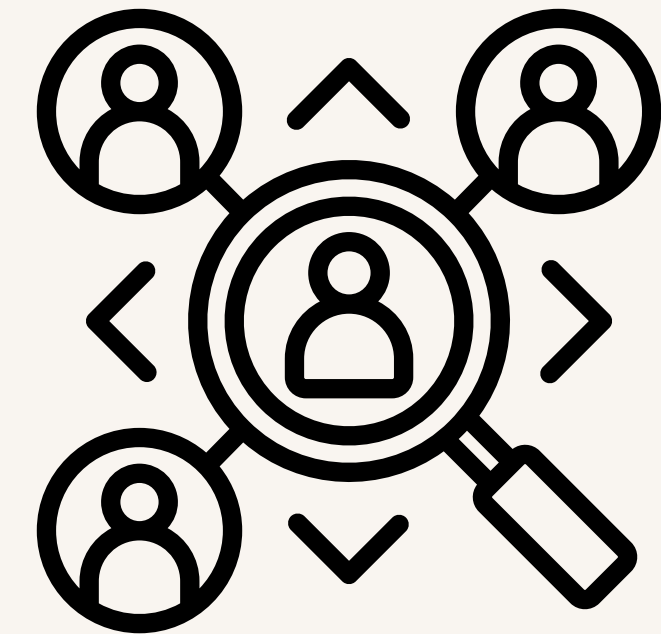


From Individual to  
Community Systems



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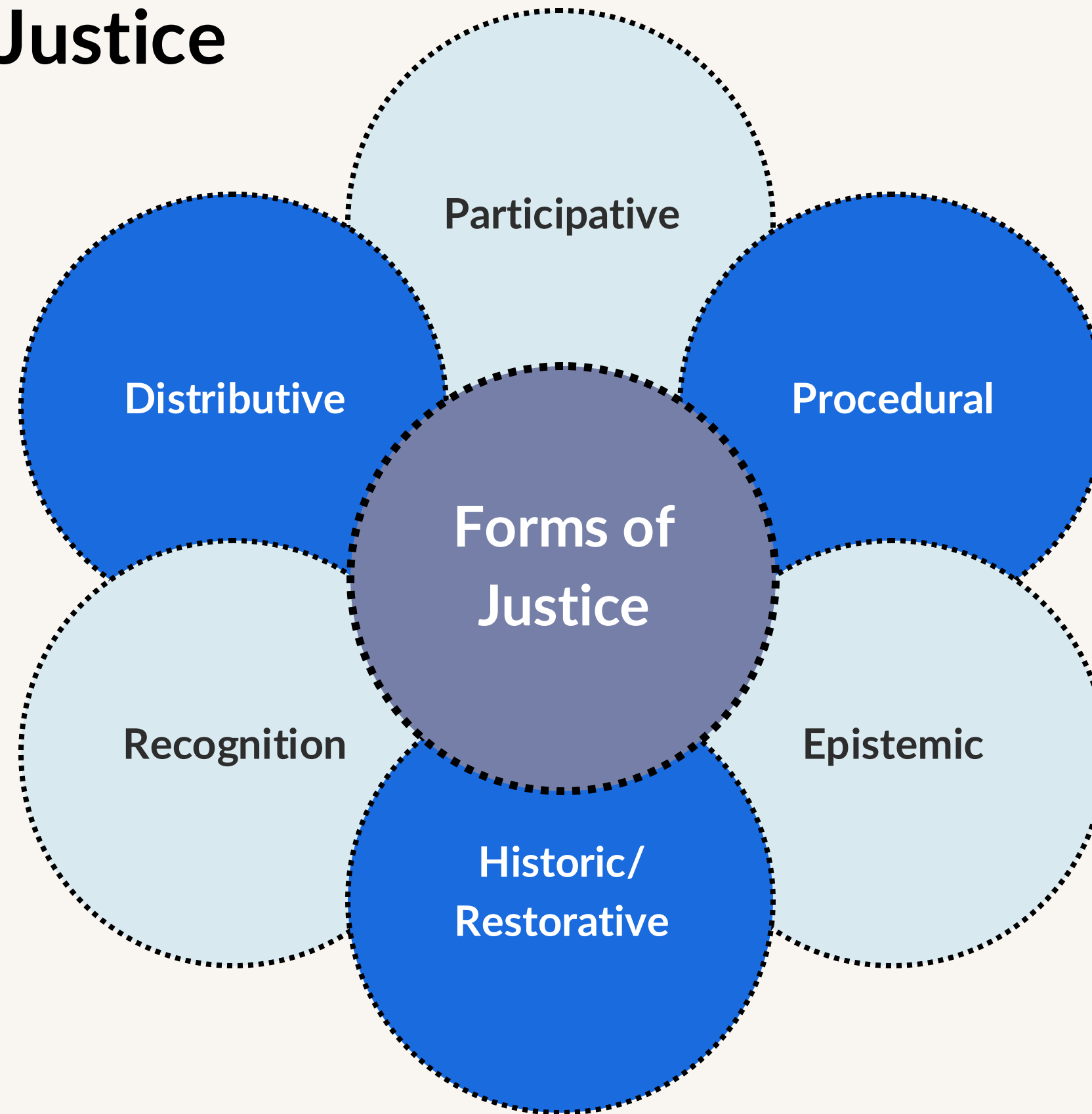
Community  
Engagement



Renewable Energy Facility  
Siting Clinic @MIT

Stakeholder Assessment  
& Engagement

# Conceptualizing Justice





# Next Steps for GENs and EJ...

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# Next Steps for GENs and EJ Priorities

## Legislation



## Improved Participation Across Sectors



## Education & Awareness



## Action at Every Level



# Next Steps for GENs and EJ Priorities

## Questions for Reflection:

How can we make sure that an **EJ framework** or perspective is included in future Geothermal Energy Network (GENs) projects & initiatives?

How can we make sure that all forms of justice are considered?





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# Thank you for your attention.

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IAP 2025

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