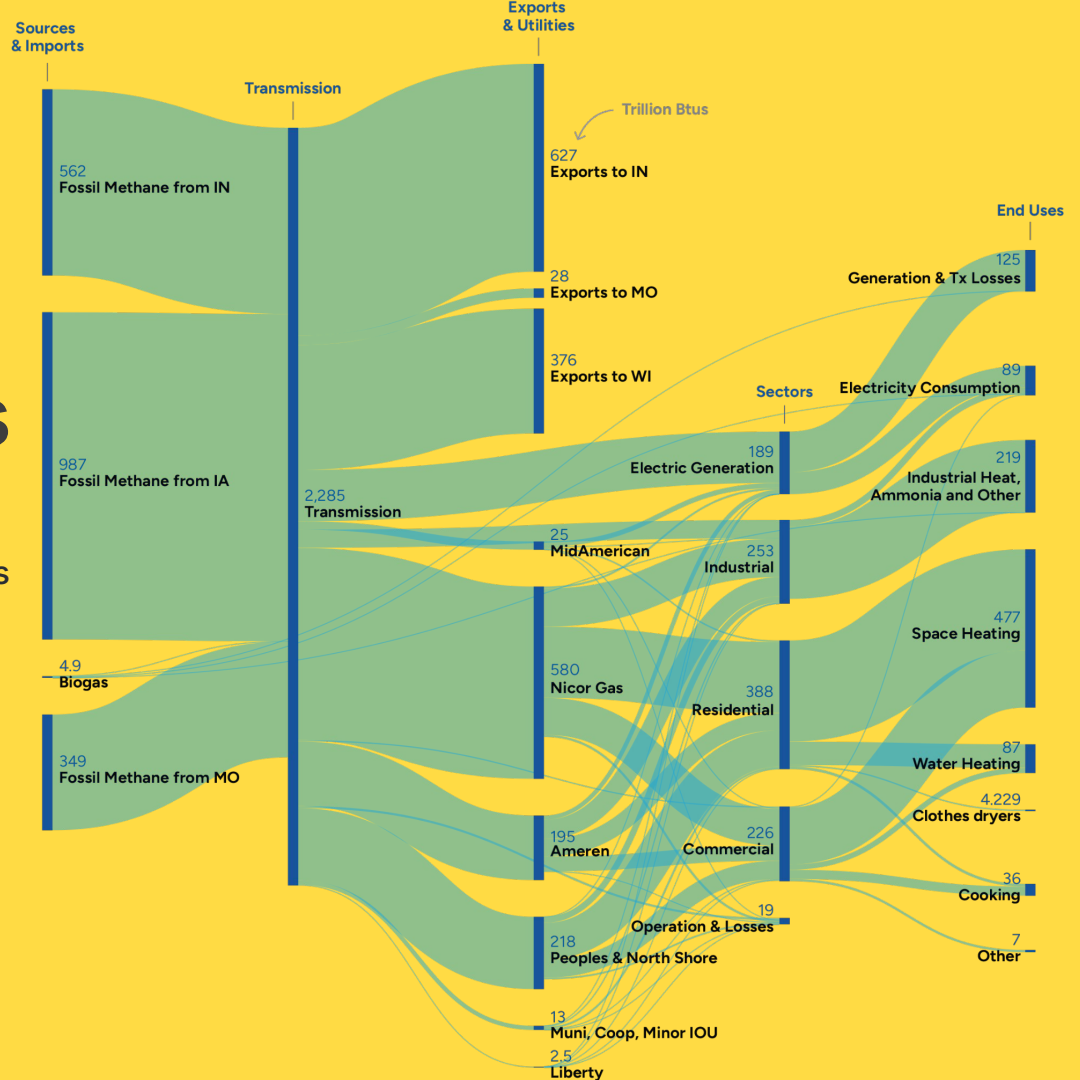
BUILDING DECARBONIZATION COALITION

BDC PRESENTS

The Future of Gas

The regulatory proceedings, economic analyses and equity policies shaping the methane gas system

Thursday, Sept. 26, 2024
10am PT / 1pm ET



About the BDC

The Building Decarbonization Coalition (BDC) aligns critical stakeholders on a path to transform the nation's buildings through clean energy, using policy, research, market development and public engagement.

The BDC and its members are charting the course to eliminate fossil fuels in buildings to improve people's health, cut climate and air pollution, prioritize high-road jobs, and ensure that our communities are more resilient to the impacts of climate change.

- **Sign up for our newsletter!** https://buildingdecarb.org/newsletter
- **Membership is free!** Join us! buildingdecarb.org/join

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Thank you to our Trailblazer Members!

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Upcoming Events

National Policy Call

New York
October 8 at 1 pm ET

California Policy Call

Oct 15 at 10 am PT

BDC Presents:

State of the Union:
Post-Election Decarb Outlook

Nov 7 at 10 am PT

Webinar Logistics

- Everyone is muted.
- Ask **questions** for our panelists in the **chat.**
- Drop **comments** for the whole group in the **chat.**
- This webinar is being recorded and will be placed in our website's Resource Library.
- All registrants will be emailed with a link and additional resources early next week.

Today's Panelists

Kristin George Bagdanov, PhD

BDC

Senior Manager of Policy Research

Joe Dammel

RMI

Manager, Carbon-Free Buildings

Dorie Seavey, PhD

Groundwork Data

Senior Research Scientist

Morgan Edwards, PhD

University of Wisconsin, Madison

Assistant Professor

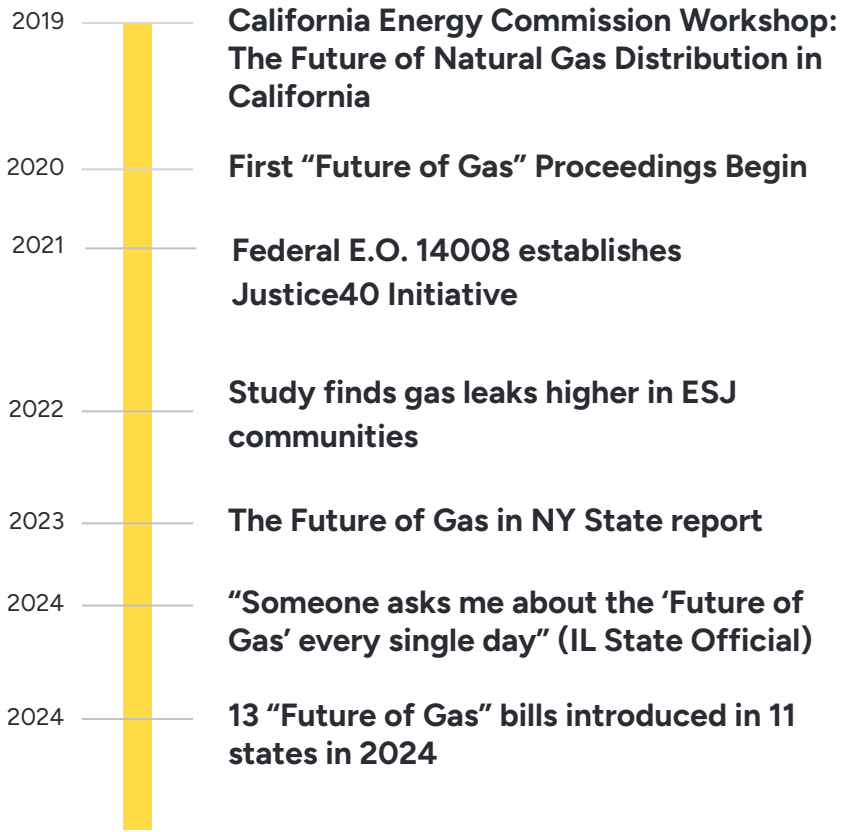
BDC

What is the Future of Gas?

Kristin George Bagdanov

“The Future of Gas”: from phrase to framework

- The “future of gas” designates a set of questions, assumptions, and arguments, associated with the long-term sustainability of the methane gas system.
- Since 2019, there has been a growing consensus about what the future of gas should be and how we should get there
- We need to establish certain economic, regulatory, and equity arguments as fundamental truths in order to move individual states and the whole movement forward



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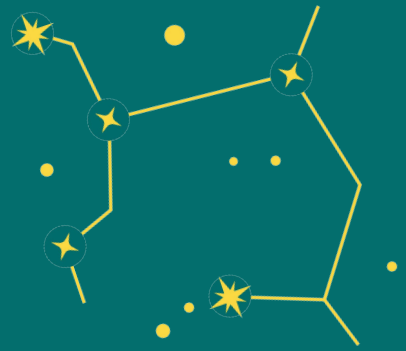
Building consensus and accelerating movements

Critical mass of people

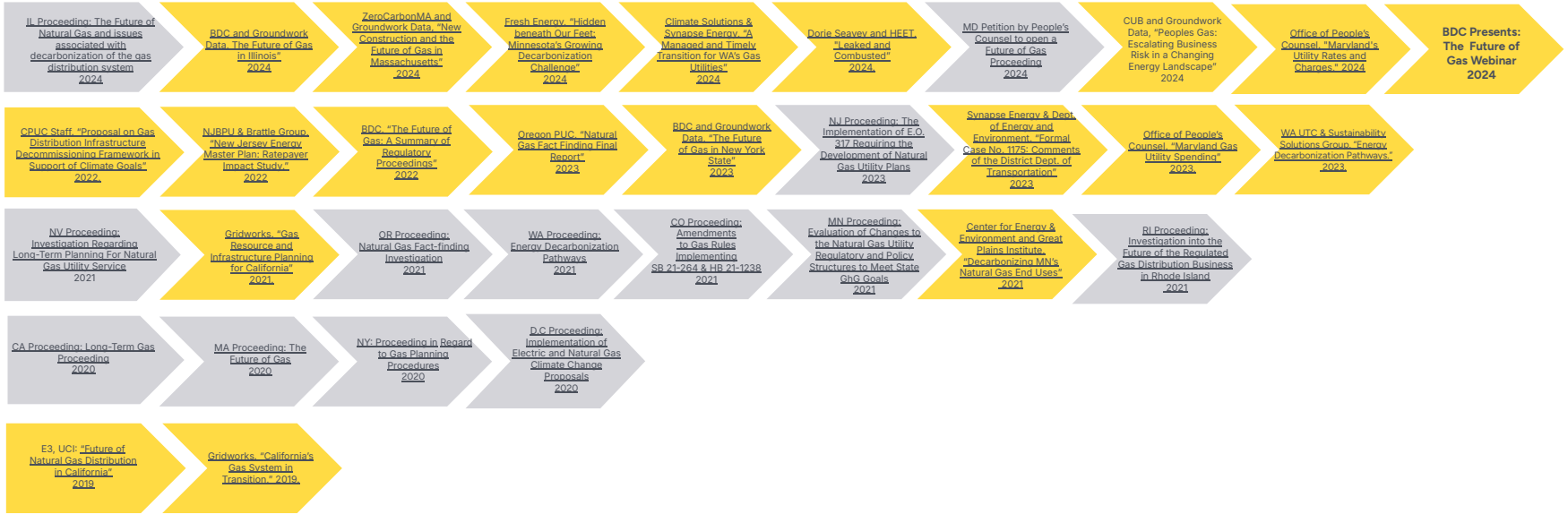
Archive of evidence and experience-based arguments and actions

Constellation of new concepts that shift paradigm



Raising the Baseline: Five years of evidence and advocacy

2024: There are significant social, economic, and regulatory reasons why a managed transition off the gas system is necessary



2019: There is a need to engage in long-term gas system planning in light of climate targets

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What we know now about the future of gas

1. Our climate targets are in conflict with gas system growth
2. The polluting effects of the gas system are unevenly distributed
3. The new reality of competing gas and electric monopolies requires a new regulatory framework
4. Gas utilities are no longer a sound economic investment and their business model will not withstand increasing regulatory scrutiny and policy changes
5. Pipeline replacement programs are a bandaid for stagnating growth
6. Past investments will continue to shape future rates for decades (the “undertow effect”)
7. Vulnerable communities will be harmed if the transition off the gas system is not thoughtfully managed
8. Regulators have a crucial role to play in determining the success of our climate policies
9. The energy system data needed for planning and managing the transition should be broadly accessible
10. Cost recovery is allowed, not guaranteed, and a higher standard for investments is needed in rate cases

Regulatory Landscape

Joe Dammel

The Future of Gas

Regulatory Overview

Joe Dammel

September 26, 2024

RMI's work targets energy production and use to limit global temperature rise to 1.5°C.

Our mission is to transform the global energy system to secure a clean, prosperous, zero-carbon future for all.

We talk about the future of gas *in* Future of Gas proceedings.

Ok, but what does that even mean?

Where are they happening?

How do they begin?

Why are they happening?

What's up for debate?

How do they unfold?

Where else do future of gas issues arise?

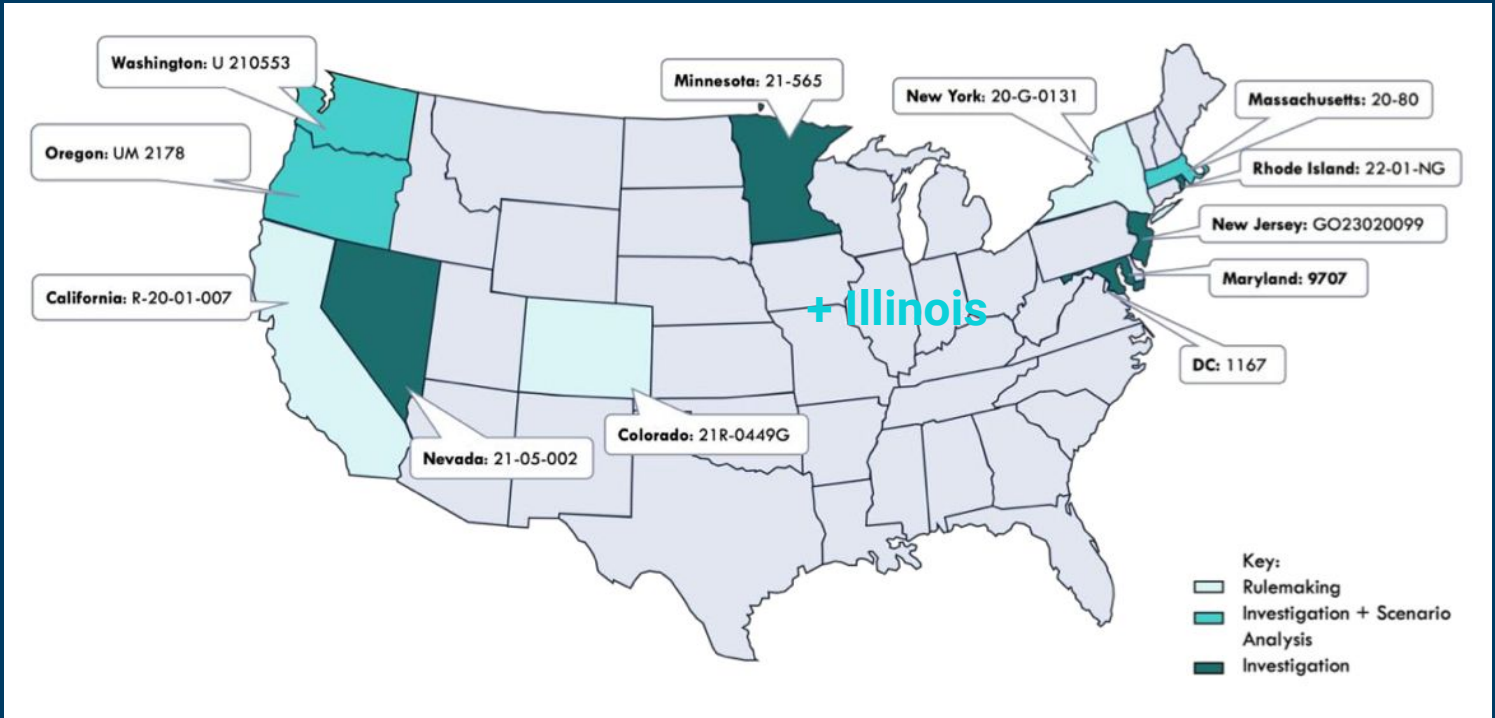
What outcomes to expect?

What are challenges?

How to advance the conversation.

Future of Gas proceedings live at state public utilities commissions.

One-third of the US population lives in a state with a Future of Gas proceeding



Relating to the Commission's examination of energy decarbonization impacts and pathways for electric and gas utilities to meet state emissions targets, Docket U-210553

Petition of the Office of People's Counsel for Near-Term, Priority Actions and Comprehensive, Long-Term Planning for Maryland's Gas Companies

Future of Gas proceedings go by many names.

In the Matter of a Commission Evaluation of Changes to Natural Gas Utility Regulatory and Policy Structures to Meet State Greenhouse Gas Reduction Goals

Initiation of proceeding to examine the Future of Natural Gas and issues associated with decarbonization of the gas distribution system.

Investigation by the Department of Public Utilities on its own Motion into the role of gas local distribution companies as the Commonwealth achieves its target 2050 climate goals.

And Future of Gas proceedings can originate via:

PUC Investigation
Legislation
Petitions
Executive Orders

But Future of Gas proceedings have common drivers.

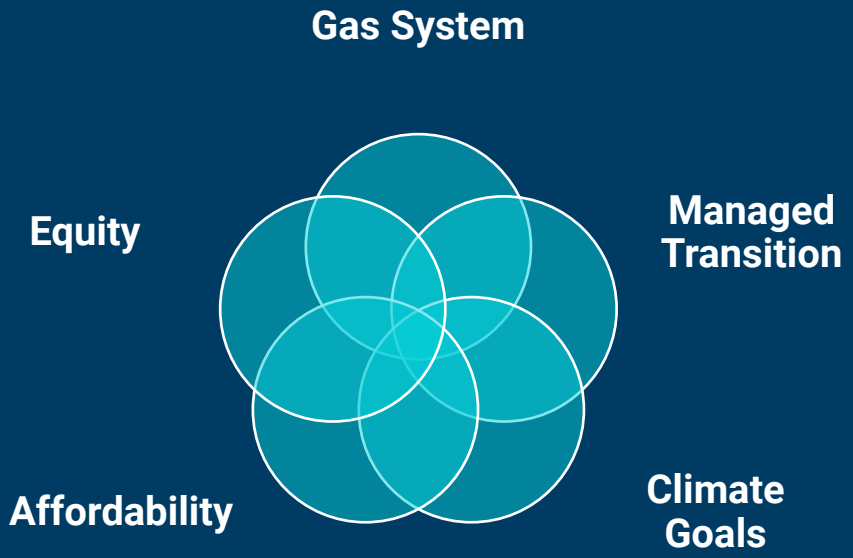
Climate
Affordability
Health
Equity

What gets discussed in a FOG proceeding?

A non-exhaustive list.

- Decarb pathways
- Gas infrastructure spending
- Line extension allowances
- Utility EE programs, fuel switching
- Alternative resources and technologies
- Rate design
- Marketing
- PBR/PIMs
- Utility business model
- Affordability & Equity
- Obligation to Serve
- Non-(gas)pipeline alternatives
- Gas resource and capital planning
- Integrated energy planning
- Electric system impacts
- Benefit-cost tests
- Workforce impacts
- Accelerated depreciation

What gets discussed in a FOG proceeding?



What gets discussed in a FOG proceeding?

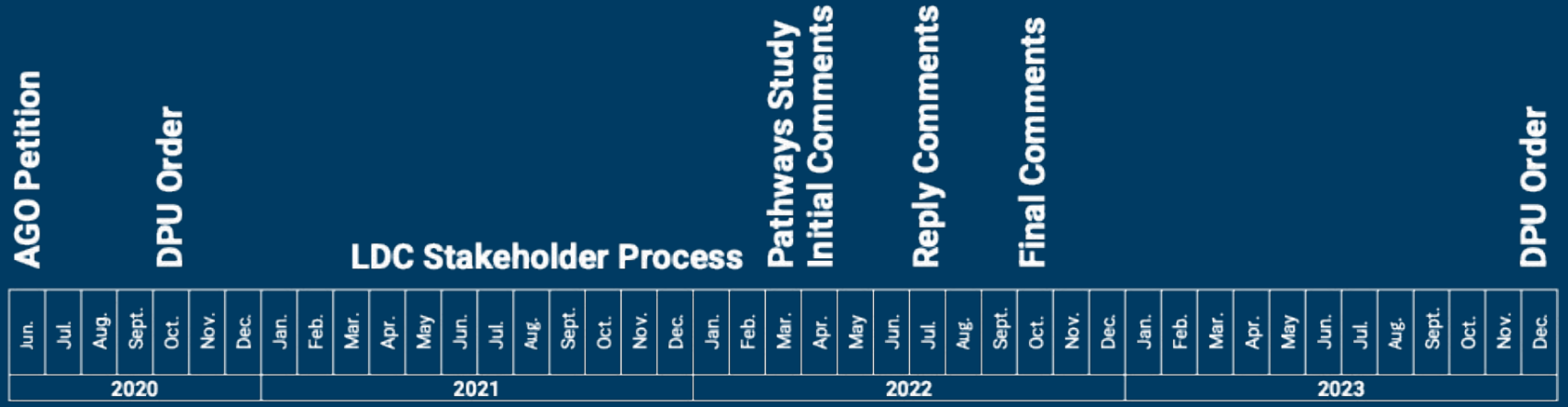
What happens in a FOG proceeding?

A “typical” proceeding

- Open docket
- Comment periods
- Technical conferences/workshops
- Interim orders
- Decarbonization pathway study
- Working groups
- Commission Order
- Rulemaking
- Additional policy discussions and/or dockets

What happens in a FOG proceeding?

Mass. 20-80



Future of Gas Outcomes

- **PUC Orders**
  - PUC orders can establish principles, select decarbonization pathways, initiate rulemakings and/or spin-off dockets, adopt reports
- **Legislation**
  - Legislation can reform policies (e.g., LEAs, OTS), establish NPAs, require clean heat plans, establish gas planning, clarify PUC authority
- **Rulemaking / New Proceedings**
  - A process to establish new policy, including for gas planning, LEAs, NPAs, rate design/reform

Future of Gas Outcomes

Good		Bad
Establishment of clear overarching and interim objectives for proceeding	**Objective**	Overly-broad and/or vague objective with unclear goals/outcomes
Regulatory timelines are clear, balancing record development / stakeholder participation with PUC Orders	**Process**	Frequent deadline extensions, lack of communication about process, long gaps with no movement in docket
PUC takes meaningful action to establish principles, frameworks, initiate future proceedings or rulemaking, relies on record and existing authority to meet FOG objectives	**Action**	The docket closes with no actionable next steps, the PUC declines to adopt meaningful policy changes or cites lack of legislative authority

Where else is the future of gas discussed?

- **PUC**
  - Rate cases
  - Rate rider proceedings
  - Energy efficiency / fuel switching
  - Gas procurement
  - Gas integrated resource planning
  - Electric utility dockets (e.g., resource and distribution planning)
- **Governor's Office / State Agencies**
  - Climate action planning
  - IRA implementation
  - Commissioner appointments
  - Clean Heat Standards
- **Legislature (bills, hearings, etc.)**
  - Thermal energy networks
  - Obligation to serve
  - Multi-year rate cases
  - Preemption
  - Clean Heat Standards
  - Utility infrastructure cost recovery
  - Performance-based regulation
  - Line extension allowances
  - Utility accountability

Challenges

- Issues are complex, far-reaching, and consequential
- Shortage of resources and time
- Questions of authority and direction (PUC – Legislature – Governor's Office)
- Balancing building the record and taking action

The future of gas is more than just Future of Gas proceedings.

The Economics of Gas

Dorie Seavey

BDC

The changing economics of gas distribution

Dorie Seavey
26 September 2024
"BDC Presents: The Future of Gas"

Background note 1: Why the need for independent economic research on this topic?

Because of the traditional regulatory framework for gas utilities:

- No more than a 5-year lookout, even though utilities have multi-decade plans
- Splintered dockets that parcel out facts and issues
- Accelerated replacement programs rubber stamped via generic appeal to “safety and reliability” vs rigorous benefit/cost analysis
- Regulators claims that they are not allowed or required to consider climate or health impacts of leaked and combusted gas
- Absence of coordinated planning between electric and gas utilities and attention to alternative rate design
- Inattention to asset stranding risk

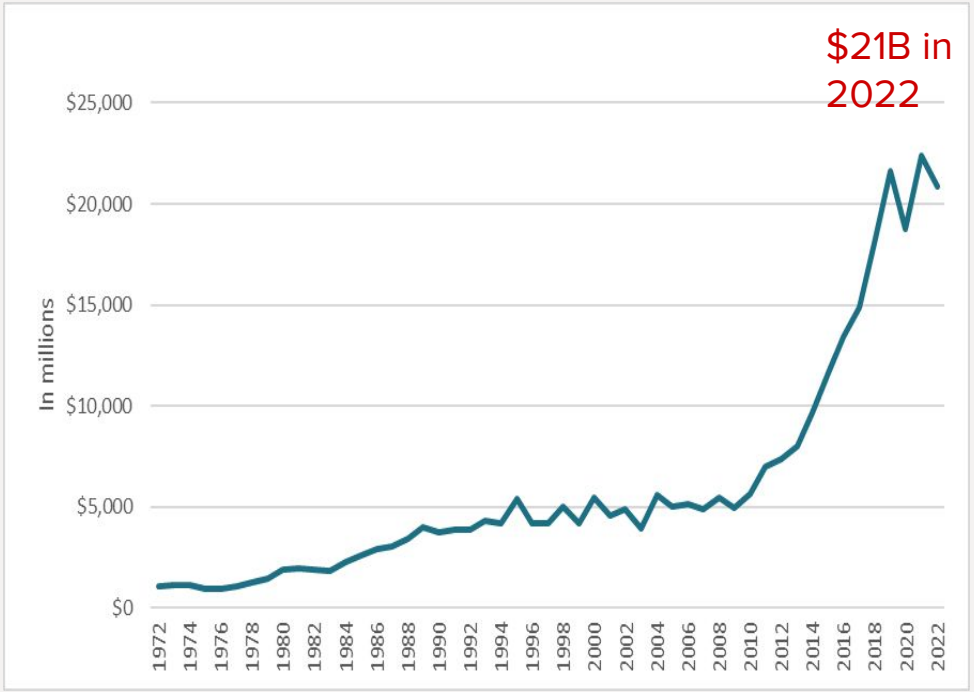
Background note 2: How the gas distribution industry is responding to the energy transition

- Proposing a future of low/ no-carbon gases (RNG/H2) that repurposes existing pipeline networks
- Massive capital spending:
  - ➢ 3x increase in gas capex over the last decade
- Leveraging accelerated cost recovery mechanisms in ~40 states under the umbrella of safety/reliability

What is our gas system costing us?

PAST

U.S. gas utility capex spending on distribution



Source: American Gas Association

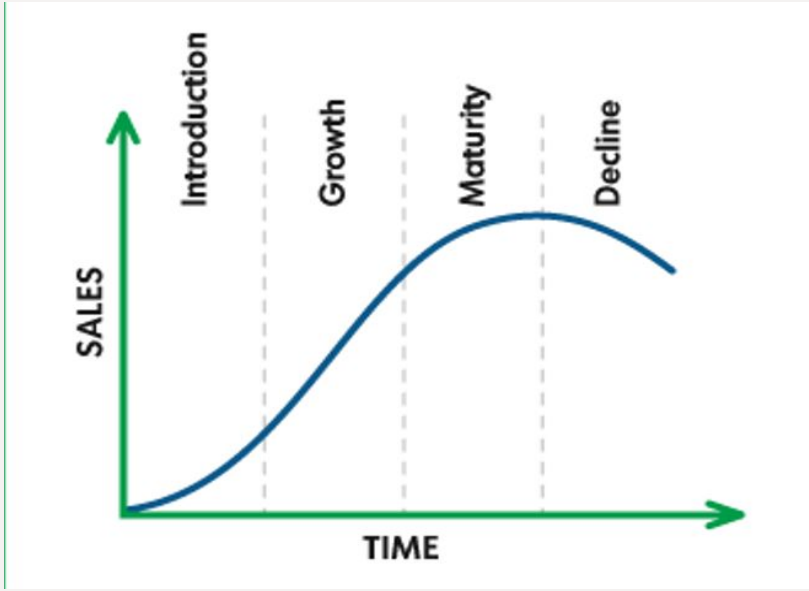
FUTURE

By 2050, continued annual spending of $21 billion would result in a fully-loaded capital cost of **$1.4 trillion** ($2022).

Source: Seavey (2024), *Leaked & Combusted*

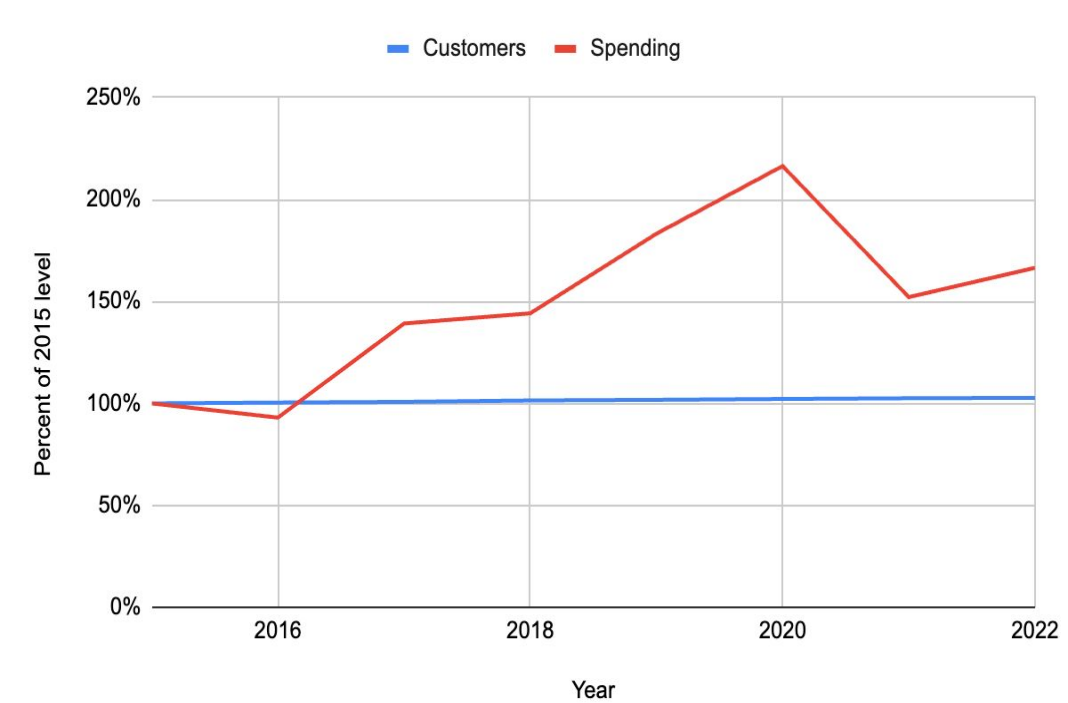
Six key research findings on the economics of gas

1. Today's gas distribution industry is in its "mature" lifecycle phase



- In most states, gas distribution industry achieved market saturation in 1970s-1980s and now shows plateaued customer growth and level throughput.
- Competitive threats abound but regulated utilities are heavily insulated compared to more competitive industries.

1 cont'd. Illinois example: Paradox of stagnant customer base and increased spending



Source: Groundwork Data.

- CapEx averaged $1.3 billion per year from 2018-2022
- Customer count and consumption have plateaued
- Book value of gas plant increased 84% over the last decade, from $11.8 billion to $21.7 billion

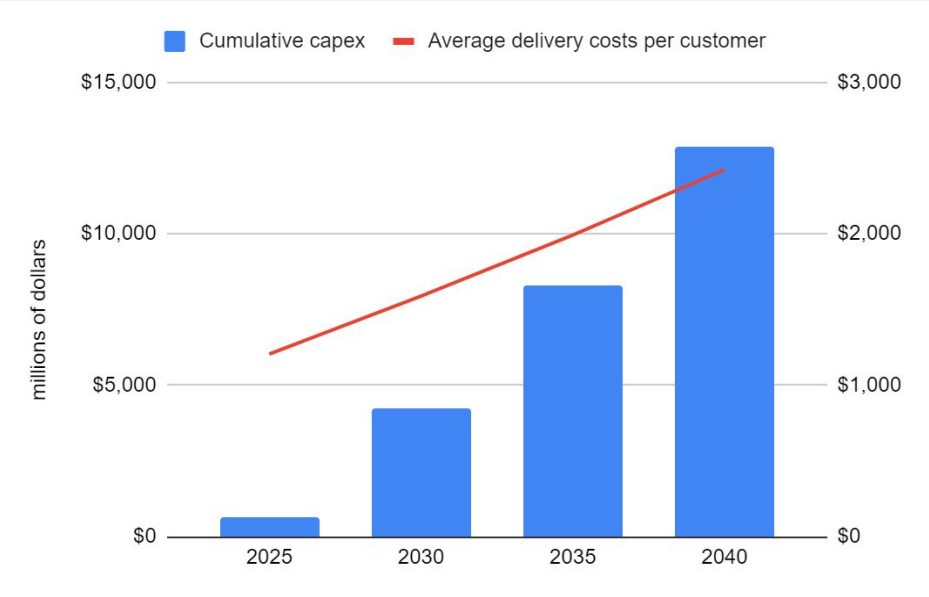
2. Regulatory practices encourage over-investment in replacement and under-investment in viable alternatives

Three perverse regulatory incentives:

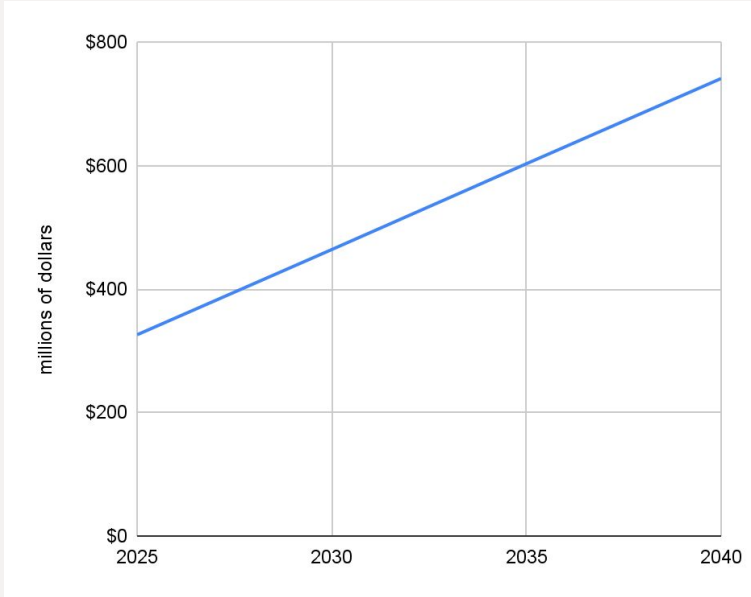
1. Gas utilities earn a rate of return on capital investments but not on leak detection and repair which are considered operational expenses.
2. Gas utilities pass on the cost of lost gas (i.e., leaks) to their customers as a normal cost of doing business.
3. Gas distribution companies are not financially responsible for the climate and health costs caused by gas leaks and gas combustion.

3. Aggressive pipe replacement results in steep bill impacts plus record utility profits, independent of climate policy

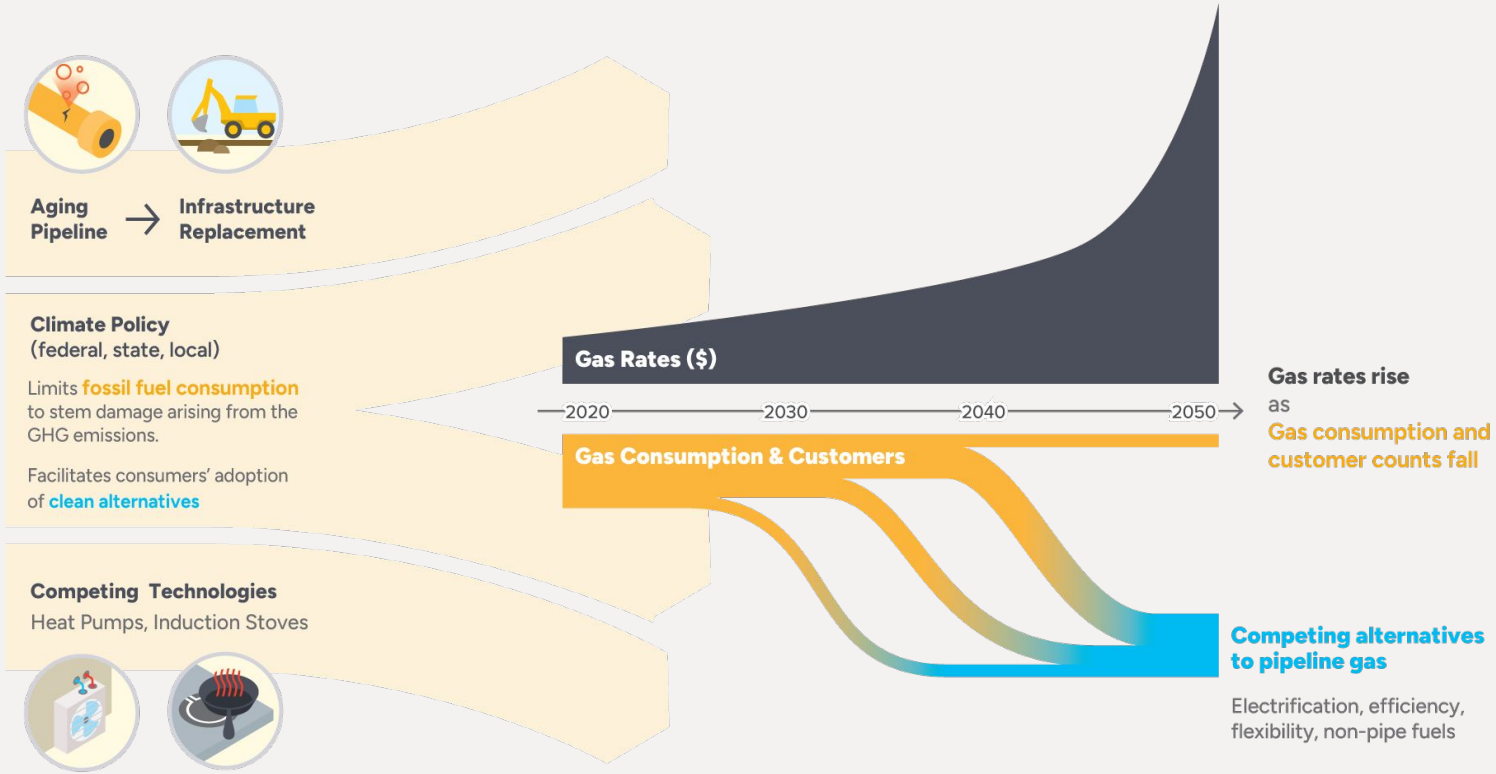
Capex and resulting bill impacts for Utility X



Annual operating income for Utility X



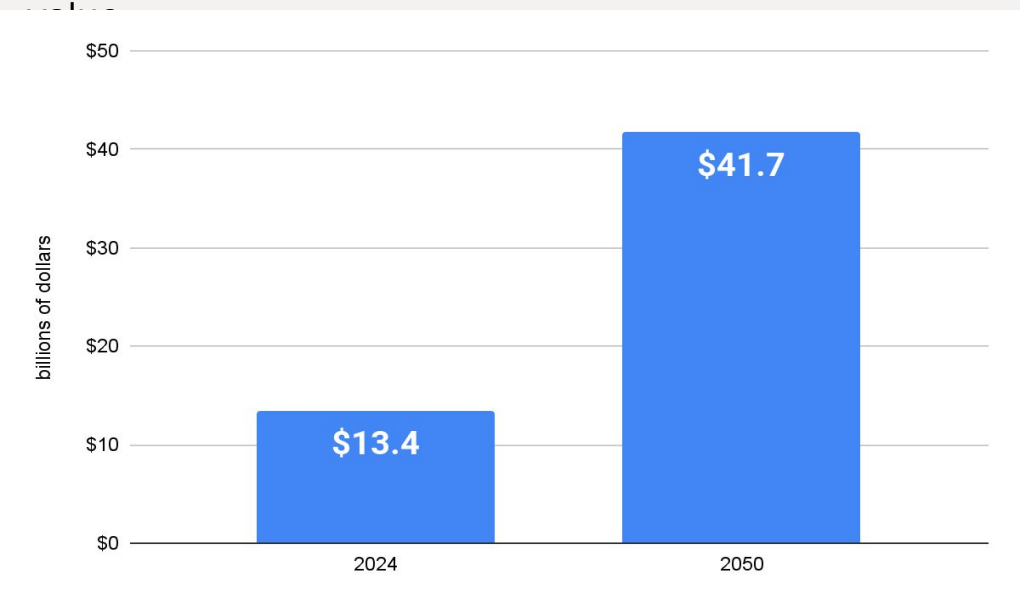
4. Customer base contraction is the “great unknown” accelerator of the gas transition



Source: Groundwork Data

5. Escalating asset stranding risks should be a serious and growing concern for all stakeholders

Gas utilities in Illinois: Magnitude of unrecovered book value



DECLINING DEMAND

+

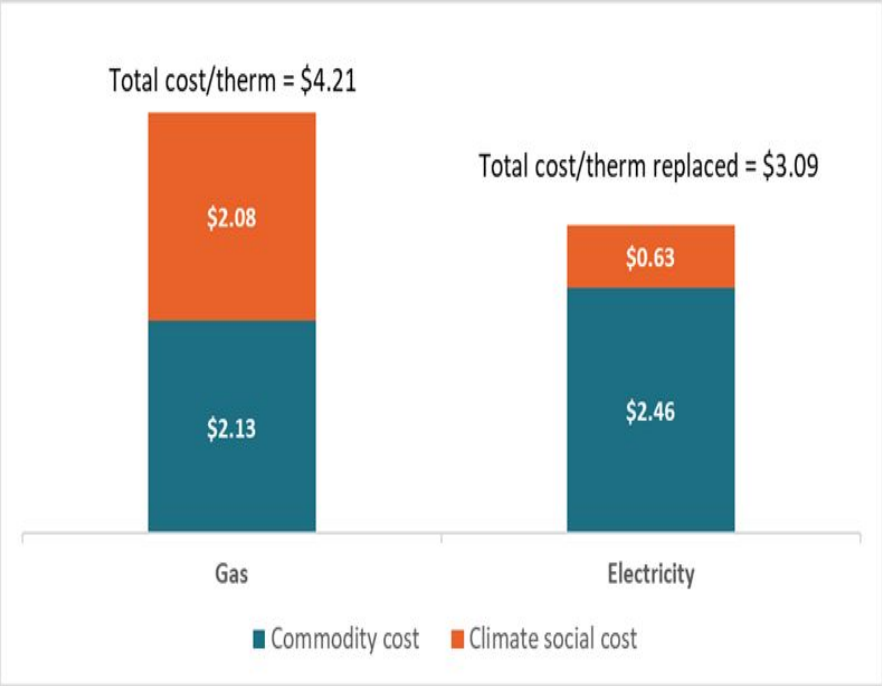
LONG ASSET LIVES

=

EARLY RETIREMENT & POTENTIAL ASSET STRANDING

Source: Groundwork Data (2024), Future of Gas in Illinois.

6. If social costs are accounted for, gas is far more expensive than electricity



- The social cost of leak and combusted gas is roughly equal to its supply cost.
- We are paying twice – once for the gas system itself and again for its harmful impacts.
- If gas commodity prices doubled to include their social cost, many gas utility assets would become uneconomic and electrification would accelerate.

Source: Example for Boston, MA in 2023. See: Seavey (2024), Leaked & Combusted.

Where do we go from here?

- **Halt further expansion of gas distribution system** (no new line extensions, customer conversions, customer hook-ups)
- **Sunset accelerated cost recovery** programs; **limit capital spending** on replacing infrastructure; and require screening for **non-pipe alternatives**
- Embark on **strategic downsizing of local gas systems** as part of a managed, phased transition off gas
- **Integrate planning and rate setting across electric and gas sectors**

Appendix: Where you can find the research (1/2)

Table 3: Studies documenting gas utility pipeline replacement program costs

City/state (program/utilities)	Study	Program goals & timeframe (est. cost per mile)	Long-term cost estimates
Chicago (Peoples Gas: System Modernization Program	Scarr & Orcutt (2019)	Replace ~2,800 miles by ~2040 ($5.7 million)	$8-$11 billion
Idaho, Oregon, & Washington (Avista, PSE, Cascade, Intermountain)	Sightline Institute (2023)	Replace 1,359 miles over next decade	$1.3 billion in capex
Illinois (4 largest investor-owned utilities)	Seavey et al., BDC & Groundwork Data (2024)	Assumes business-as-usual gas plant capex (distribution, transmission, and storage)	By 2050: $99B cumulative capex, $169B cumulative revenue requirement, $83B unrecovered gas plant Provides alternative future-of-gas scenario estimates
Maryland (Strategic Infrastructure Development & Enhancement (STRIDE)/3 largest gas utilities)	MD Office of People's Counsel (2023)	Replace ~1,550 miles by 2043 ($2.6 million for Baltimore Gas & Electric)	$206 billion from 2024-2100, including non-STRIDE gas processing capex

Appendix (2/2)

Massachusetts (Gas System Enhancement Program/all investor-owned utilities)	Seavey (2023)	Replace ~6,200 main miles from 2015-2039 ($2.2 million for CY2023)[66]	$42 billion ($2022)
Minnesota (3 largest utilities)	Larkin-Connolly & Parcels (2023)	Assumes capex necessary to achieve stated rate base growth targets	$1 billion annual capex by 2030; $19.2 billion total from 2023-2040
New York (Pipeline replacement programs of 6 largest utilities)	Synapse Energy Economics (2023) Walsh & Bloomberg, BDC & Groundwork Data (2023)	Replace 7,000+ miles & 190,000 services over next 20 years ($6.177 million including return to investors)	$150 billion cumulative revenue requirement through 2120 Provides alternative future-of-gas scenario estimates
Philadelphia (Philadelphia Gas Works: 2 cast iron programs plus other mains)	Seavey (2023)	Replace ~1,452 miles by 2058 ($2.1 million)	$6-$8 billion
Washington, DC (Washington Gas: PROJECTpipes)	Synapse Energy Economics (2023)	Replace ~400 miles over next 30 years ($9.1 million for cast iron & steel main)	$8-$12 billion

Source: Seavey (2024), Leaked & Combusted.

Contact Information

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Groundwork Data offers advisory, research, and technology services to accelerate a clean, equitable, and resilient energy transition.

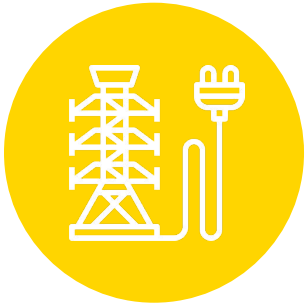
Energy Burden and Inequity

Morgan Edwards

Research at the Climate Action Lab

climate innovation

Developing tools to evaluate the impacts of novel climate technologies



infrastructure transitions

Modeling low-cost pathways to net zero energy infrastructure

energy justice

Assessing inequities in energy systems and designing solutions

Climate Action Lab team members

Prof. Morgan Edwards

Dr. Sagar Rathod

Dr. Jaime Garibay Rodriguez

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Zach Thomas

Jake Erickson

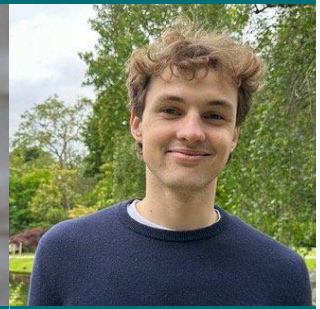
Jing Ling Tan

Nilanjan Biswas

Kyla Smith

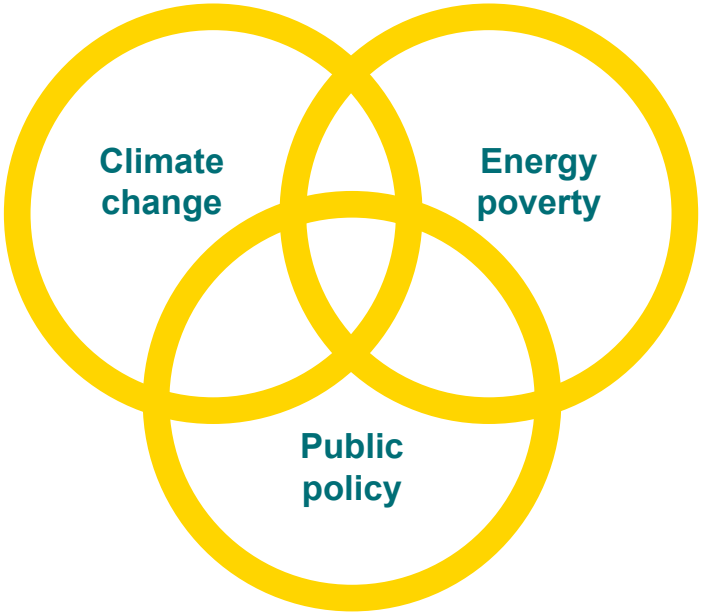
Raines Lucas

Victoria Mui



Trevor Dean

Challenges for energy infrastructure



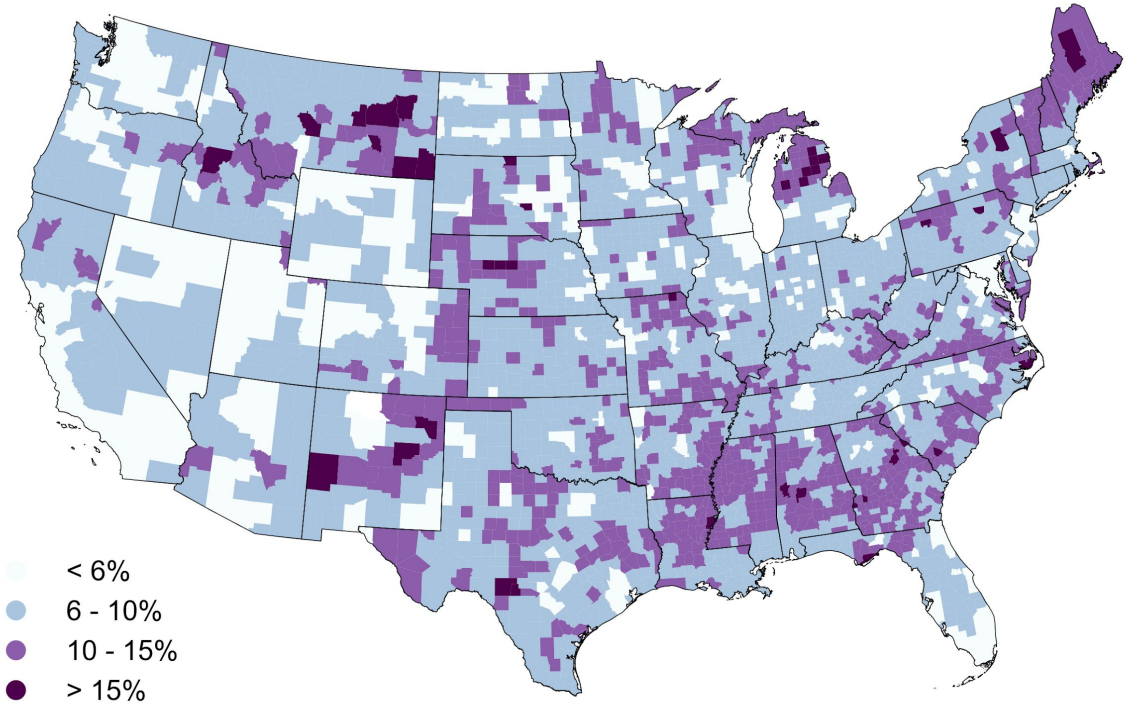
- **Climate change:** Meeting U.S. and global climate targets will major investments in energy infrastructure to reduce emissions.
- **Energy poverty:** Many U.S. households are highly energy burdened, and this number may increase with rising infrastructure costs.
- **Public policy:** Policy responses to climate change and energy poverty have historically been insufficient to address these issues.

Energy poverty and energy justice

- A household is **energy poor** (or **energy insecure**) if they cannot meet their energy needs.
  - Surveys estimate 34 million U.S. households (27%) that they have difficulty paying their energy bills or have kept their home at an unsafe temperature due to energy cost concerns.
  - Nearly 3 million people in the U.S. have electricity shut off because they cannot pay their bills.
- A household is **energy burdened** if they spend a large percentage of their income on energy bills.
  - Low-income households are more energy burdened (7.2 vs. 3.1% on average).
- Energy burdened households are disproportionately Black, Latinx, multifamily, and renters.
- **Energy justice** calls for everyone to have access to clean, safe, affordable, and reliable energy infrastructure and to be able to participate in energy decisions that affect them

Statistics from: EIA, Bednar and Reames 2020, and Energy Justice Lab Utility Disconnections Dashboard

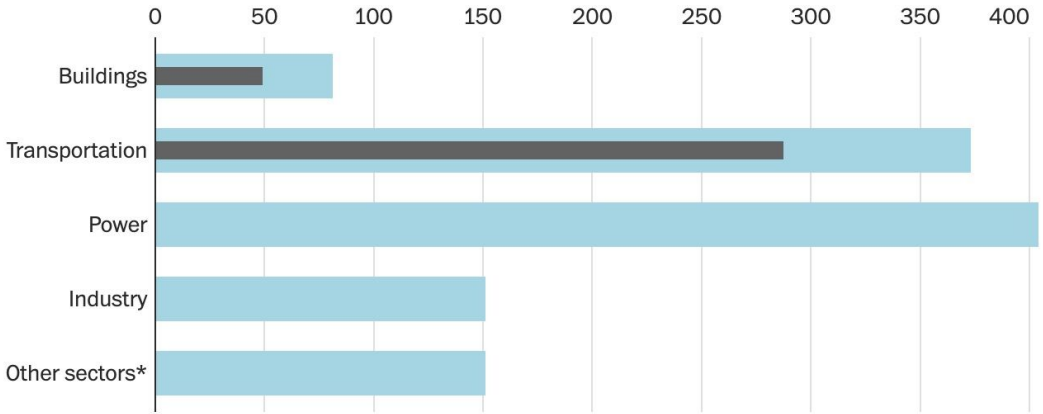
Energy burdens among low-income households



Data from DOE LEAD Tool showing energy expenditures as a fraction of income for households with less than 80% area median income.

Climate policy and household incentives

- $369 billion in climate and clean energy investments; expected to decrease energy bills overall.
- Projected to reduce emissions by ~40% by 2030; more to be done to be on track to net zero.



Total CO_2 reductions

CO_2 reductions from household technologies (~30% of total)

Image Source: Shannon Osaka and Princeton REPEAT Proeject

Questions for just building decarbonization

- How effective were previous policies to reduce the climate impacts of home heating?
- What are the patterns in heating electrification across the U.S., and are they equitable?
- What are the combined effects of previous and ongoing policies on energy poverty?

Questions for just building decarbonization

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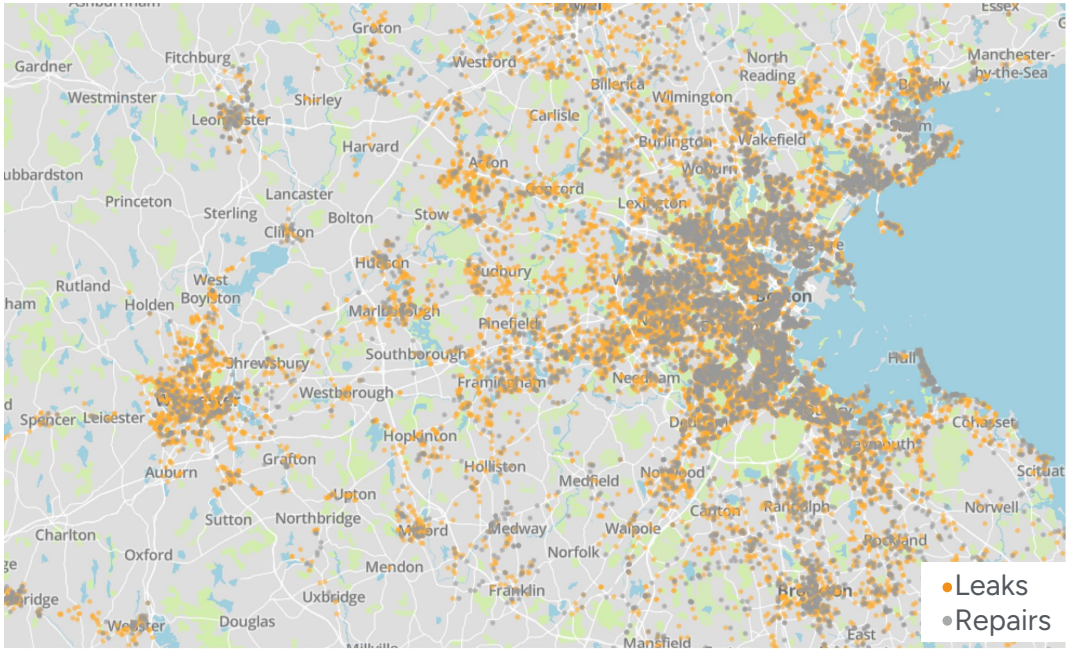
Climate impacts of gas leaks (e.g., Massachusetts)



Quantifying leaks:

300,000 metric tones (in Boston)

$90 million; 200,000 homes

10% of state emissions inventory

Explore the map:

http://climateactionlab.com/visualizations

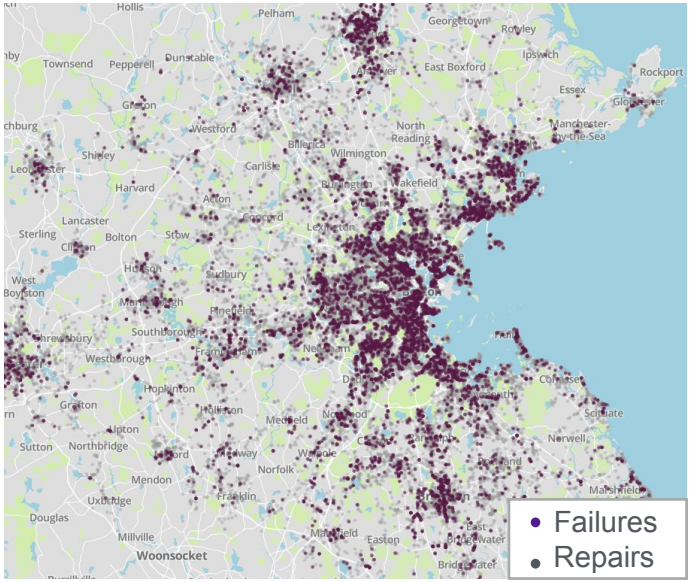
Edwards et al., Environmental Science & Technology, 2021

Leak repairs are not always successful

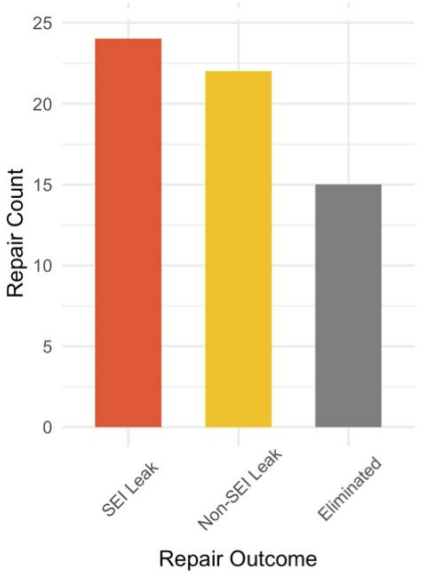
Map: Repair failures occur when a repair is made, and later a leak is repaired or reported in the same location.

Bar chart: Many large leaks (significant environmental impact, SEI) are still large (orange) or present (yellow) after repair.

9,861 repair failures (20%)



Higher failure rates for large leaks



Edwards et al., Environmental Science & Technology, 2021

Questions for just building decarbonization

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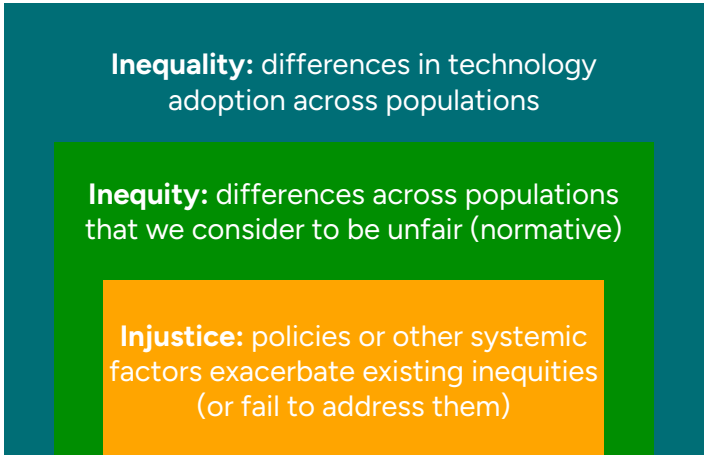
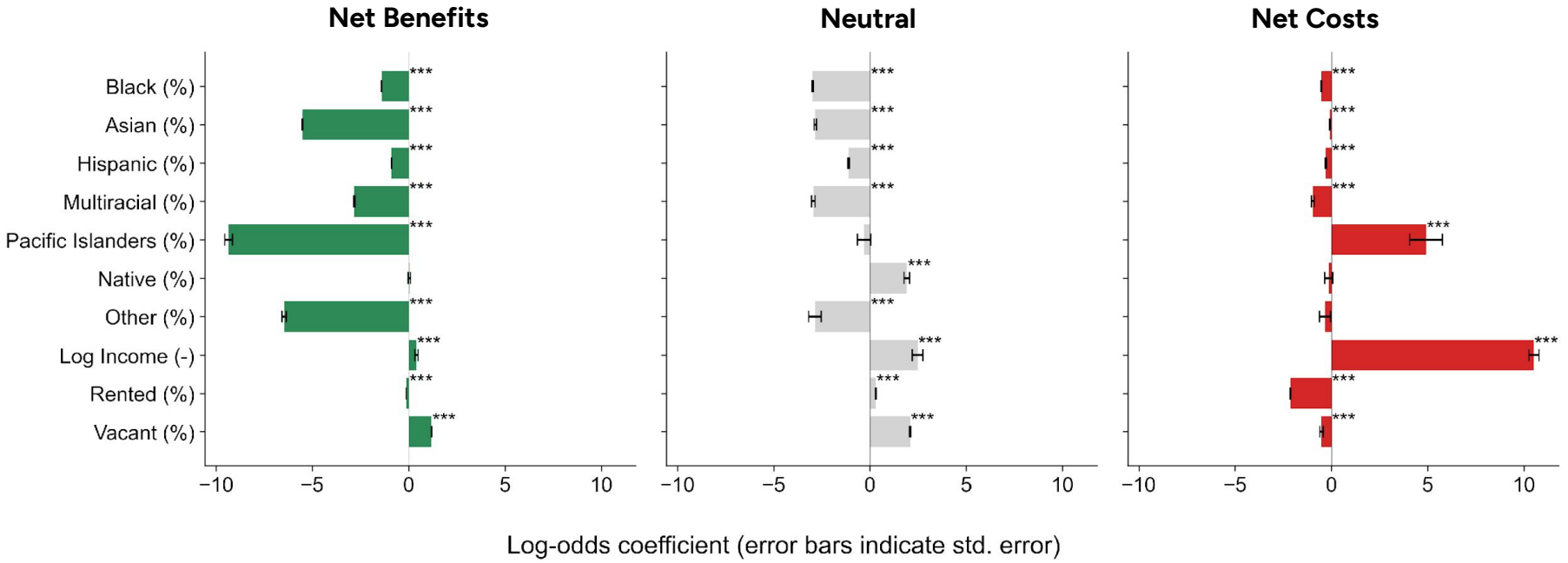
- What are the combined effects of previous and ongoing policies on energy poverty?

Inequities in household technology adoption



- Previous research finds inequities in adoption other technologies (e.g., rooftop solar):
  - Differences persist even when controlling for solar resource potential.
  - Racial and income disparities in adoption.
- Benefits of electrification via heat pumps depend on location and other factors.
- If marginalized communities are less likely to have heat pumps *when they are beneficial*, there is evidence of an inequity.

Evidence of inequities in heat pump adoption

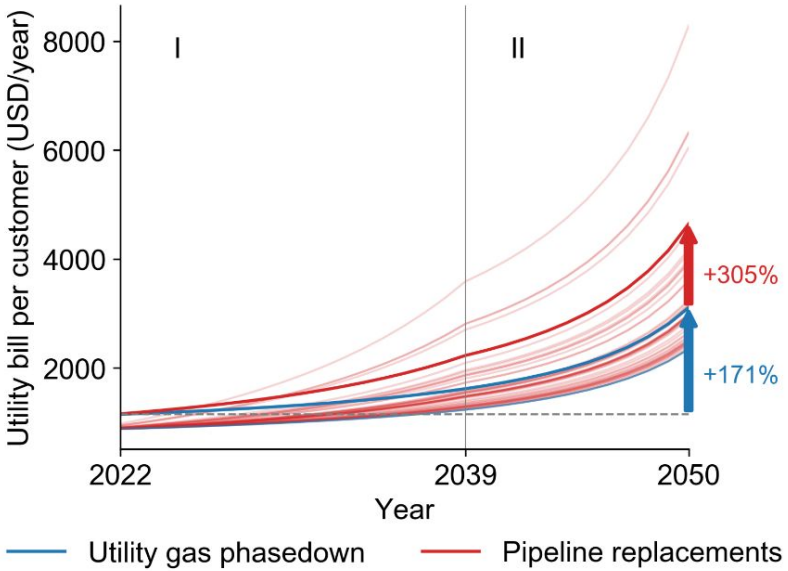


Edwards et al., in press at Joule

Questions for just building decarbonization

- How effective were previous policies to reduce the climate impacts of home heating?
- What are the patterns in heating electrification across the U.S., and are they equitable?
- **What are the combined effects of previous and ongoing policies on energy poverty?**

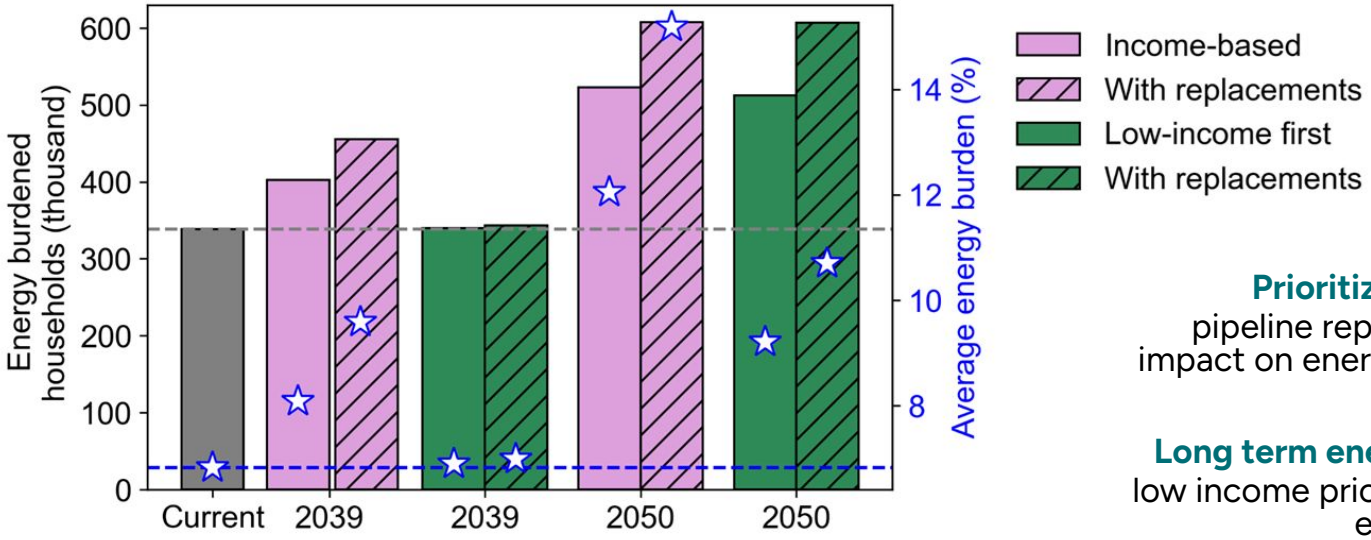
Growing cost burdens during gas phasedown



- As customers exit, per customer expenditures rise. Financial pressure from replacements further increases costs per customer.
- For this utility (the largest in the state), costs per customer increase by over 300%.
- Challenge not limited to Massachusetts.
- Nationally, average increase is 270% with replacements and 174% without.

Garibay Rodriguez and Edwards, in preparation for submission to Nature Cities

Effects of growing costs on energy burdens



Prioritizing low income
pipeline replacements have low impact on energy burden (up to 2039)

Long term energy burden impacts
low income prioritization policy is less effective

Garibay Rodriguez and Edwards, in preparation for submission to Nature Cities

Check out the latest from the Climate Action Lab at climateactionlab.com

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Q&A

Add your questions to the chat

Notes and slides will be sent to all registrants next week

Thank you to our panelists

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