

# Leaking Pipes and the Cost of Heating: The Future of Gas in MA

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**Applied Economics Clinic**  
Economic and Policy Analysis of Energy, Environment and Equity

# Applied Economics Clinic

The Applied Economics Clinic is a 501(c)(3) non-profit consulting group housed at 1012 Massachusetts Avenue, Arlington, MA 02476. Founded in 2017, the Clinic provides expert testimony, analysis, modeling, policy briefs, and reports for public interest groups on the topics of energy, environment, consumer protection, and equity, while providing on-the-job training to a new generation of technical experts.

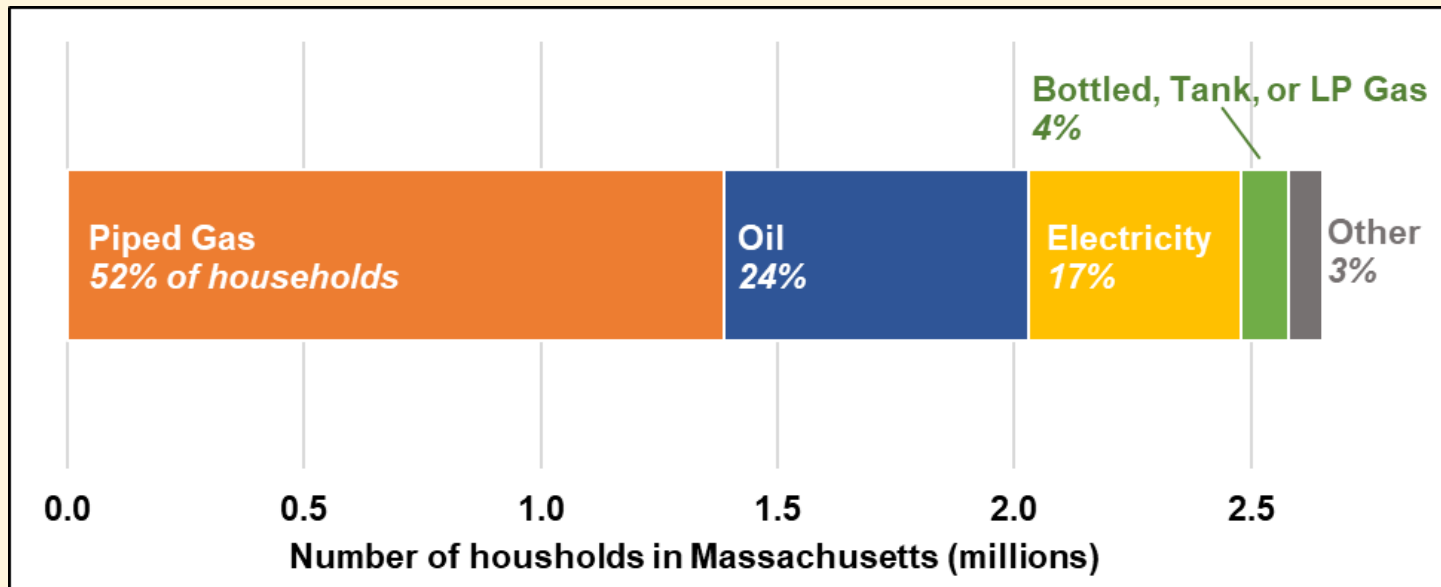
Our mission is to:

1. Provide low cost and (when we receive foundation grants) pro bono expert services to public interest groups on the topics of energy, environment, consumer protection, and equity.
2. Train the next generation of expert technical witnesses and analysts by providing applied, on-the-job learning experiences to graduate students in related fields.
3. Work proactively to support and promote diversity in the fields of economics, engineering, math and sciences.



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# How do we currently heat our homes?

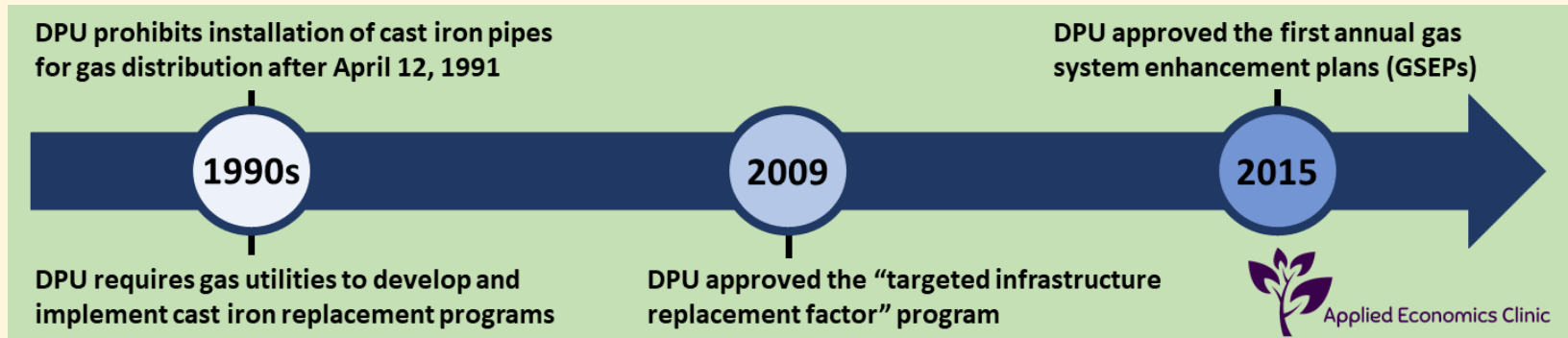


Home heating fuels in Massachusetts (2019)

# MA has ~4,800 miles of leak-prone pipes (23% of all pipes)

Leak-prone pipes pose risks to health and safety:

- Public safety
- Service reliability
- Environmental risks



# GSEP pipe replacement

In 2015, DPU approved the utilities' annual Gas System Enhancement Plans (GSEPs) to replace over 6,000 miles of aging gas infrastructure over 20 years.

- **Through 2019:** ~1,200 miles of leaky pipes have been replaced (20% of GSEP goal)
- **Going forward:** ~4,800 miles of leaky pipes remain

Year	Total Number of Leaks on System	Total Methane Emissions (MT)
2018	32,877	51,864
2019	32,252	9,097



# Costs of MA's GSEP program

Leak-Prone Pipe Replacement (2019\$, billions)	
<b>Already Spent Through 2019</b>	
Capital	\$1.6
Return to Investors	\$1.2 - \$1.4
<i>Recovered Costs-to-Date</i>	-\$0.7
<b><i>Already Spent Sub-total</i></b>	<b>\$2.1 - \$2.3</b>
<b>Additional Costs Starting 2020</b>	
Capital	\$7.7
Return to Investors	\$5.6 - \$6.5
<b><i>Additional Costs Sub-total</i></b>	<b>\$13.4 - \$14.3</b>
<b>Total Costs</b>	<b>\$15.5 - \$16.6</b>

**AEC estimates that replacing leaky gas infrastructure in MA will cost \$15.5-\$16.6 billion in total.**

Castigliero, J.R., T. Stasio, and E.A. Stanton. December 2020. *Fixing Massachusetts' Leaky Pipes: When Will It Be Paid Off?* Applied Economics Clinic. [[Online](#)]

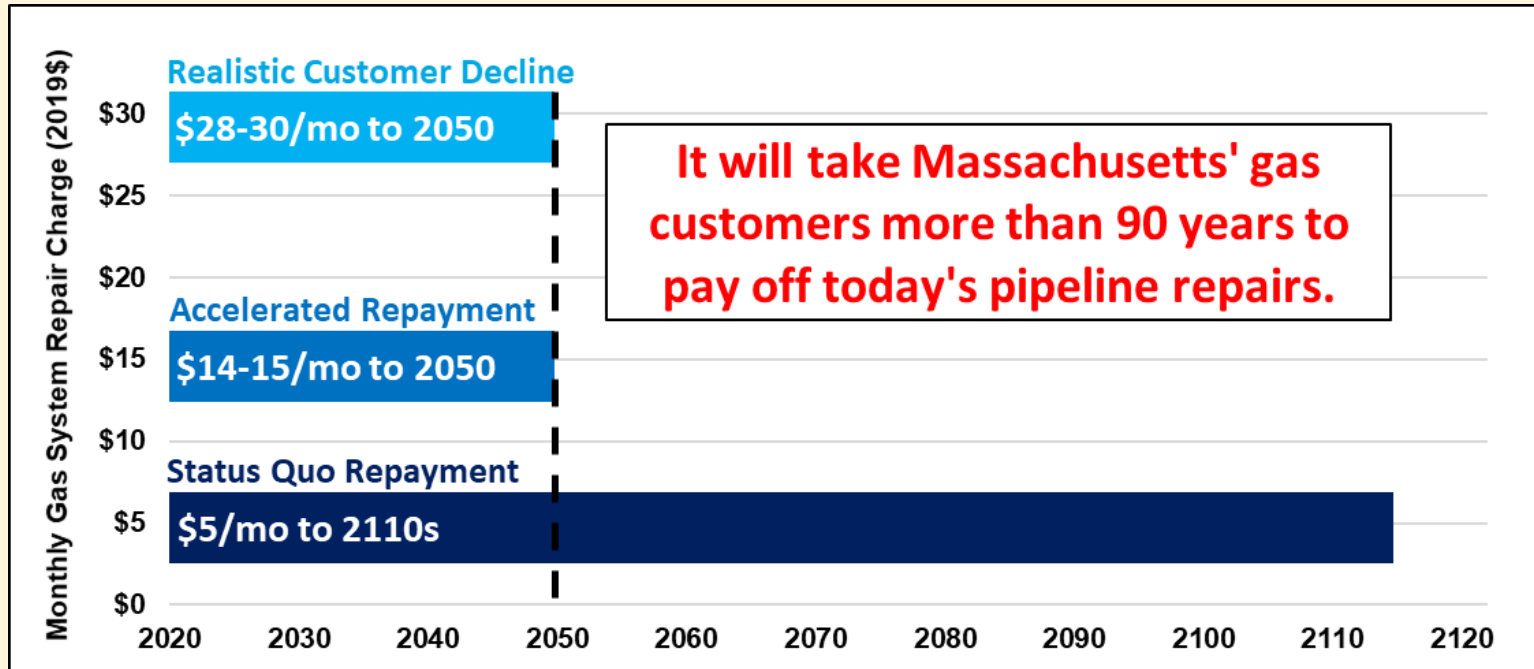
# AEC's methodology for estimating leak-prone replacement costs

AEC used a detailed capital revenue requirement calculation including:

- All realized and estimated replacement costs
- Depreciation and rate of return on the undepreciated balance using a depreciation period of 15 years
- A range for “pre-tax” rate of return of 8.69 to 10.07%
- An assumed escalation rate of 2%



# Customers' pay for GSEP costs on their gas bills



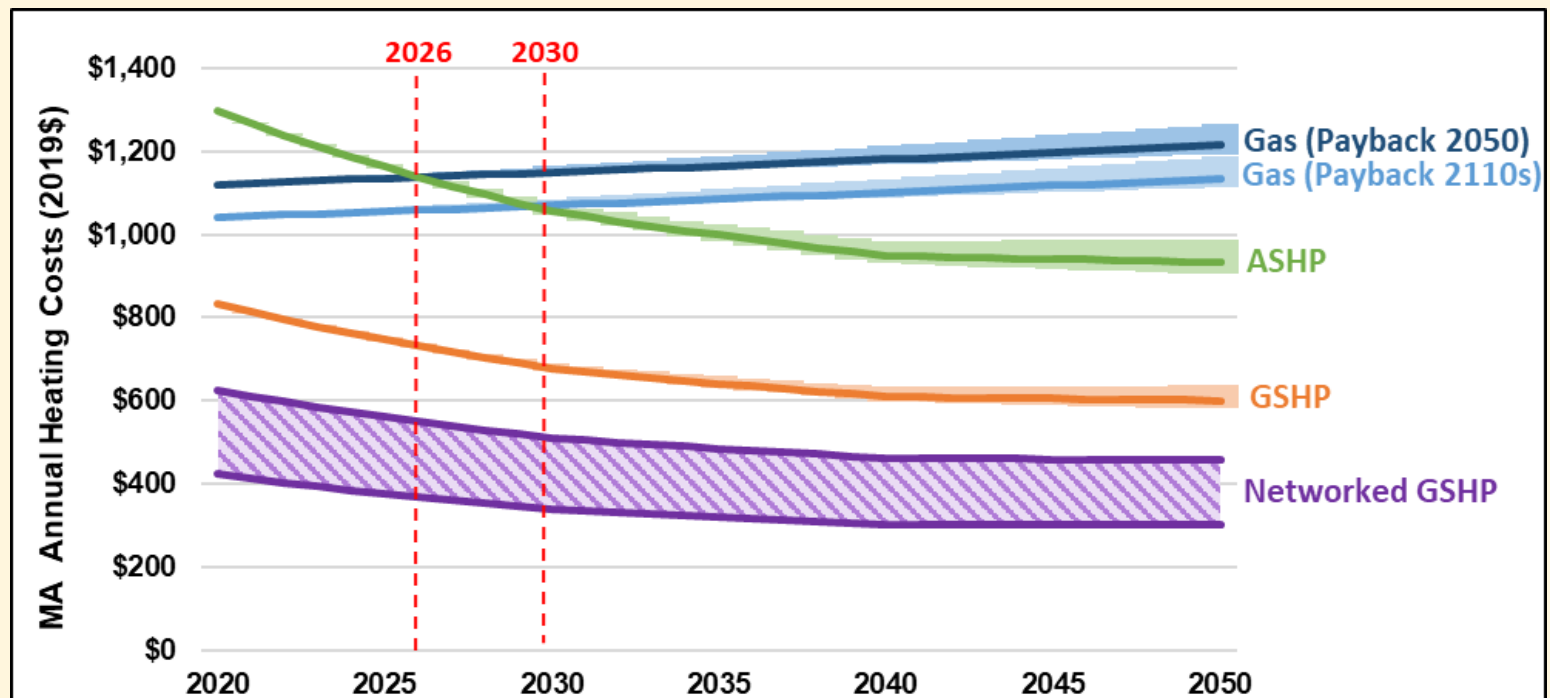


# MA climate goals and the future of gas

- Massachusetts aims to achieve emissions reductions of 45% below 1990 levels by 2030 and net-zero emissions by 2050 (reducing emissions by at least 85% below 1990 levels)
- Current gas customers will need to transition away from gas to other energy sources with lower greenhouse gas emissions.
- Gas system investments made today may be abandoned in the near future—causing “stranded assets”



# Heating with electric heat pumps costs less



Castigliero, J.R., S. Alisalad, T. Stasio, and E.A. Stanton. January 2021. *Inflection Point: When Heating with Gas Costs More*. Applied Economics Clinic. Prepared for HEET. [\[Online\]](#).

**Additional Resource:** Lopez, R., T. Comings, E.A. Stanton, and E. Tavares. 2019. *Home Heat Pumps in Massachusetts*. Applied Economics Clinic. Prepared for Green Energy Consumers Alliance. [\[Online\]](#)



# Barriers to building electrification

Barriers	Descriptions
<b>Physical</b>	Obstacles that hinder the retrofit of existing heating systems, such as: <ul style="list-style-type: none"><li>• substandard electrical systems,</li><li>• incompatible infrastructure, and</li><li>• limited workforce capacity.</li></ul>
<b>Economic</b>	Financial restraints that impede widespread adoption of heat pumps, particularly for low- and moderate-income households, such as: <ul style="list-style-type: none"><li>• high upfront costs, and</li><li>• limited access to credit.</li></ul>
<b>Informational</b>	The perceptions of available heating options can limit heat pump installs due to: <ul style="list-style-type: none"><li>• inadequate information/misinformation,</li><li>• status quo bias, and</li><li>• slow stock turnover.</li></ul>

# Policy options: Making clean energy and lower heating bills accessible to all

- Incentives for purchasing heat pumps
- Subsidies for low-income and rental housing heating + upgrades
- Education and outreach to increase information availability



# Questions?

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# Thanks!

