Residential Electrification

A Public Discussion

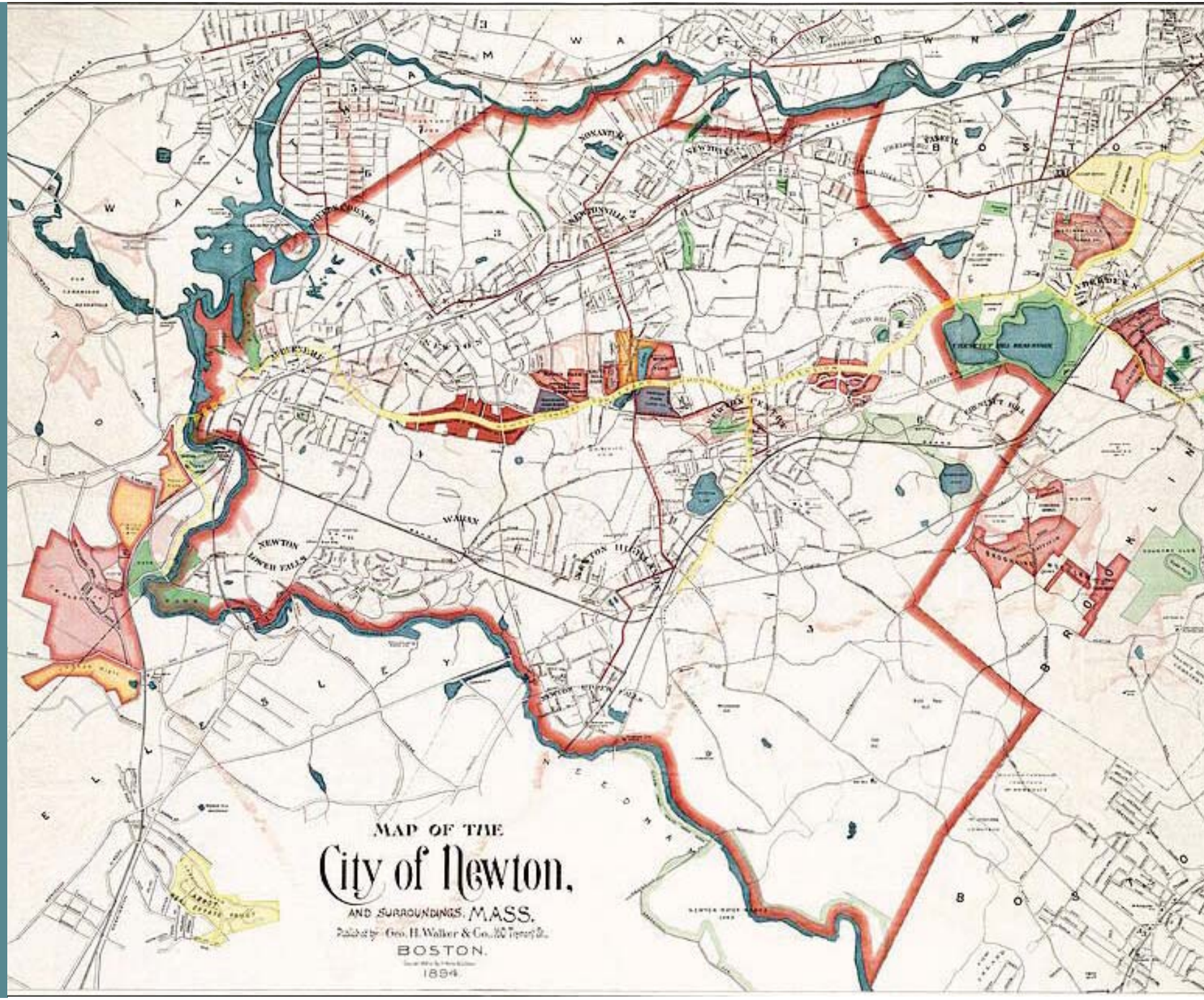
Zoning & Planning Committee

Public Facilities Committee

Newton Citizens Commission On Energy

Jonathan Kantar
Rachel White
Jon Slote

May 28, 2025



Newton Citizens Commission on Energy (NCCE)

In 2019, the NCCE prepared the Citizens' Climate Action Plan, a forerunner to the City's first official Climate Action Plan.

Philip Hanser
Chair

Jon Slote
Vice Chair
Jay Snyder
Vice Chair

Michael Gevelber
Stephen Grody
Jonathan Kantar
Rachel White

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Ex-officio
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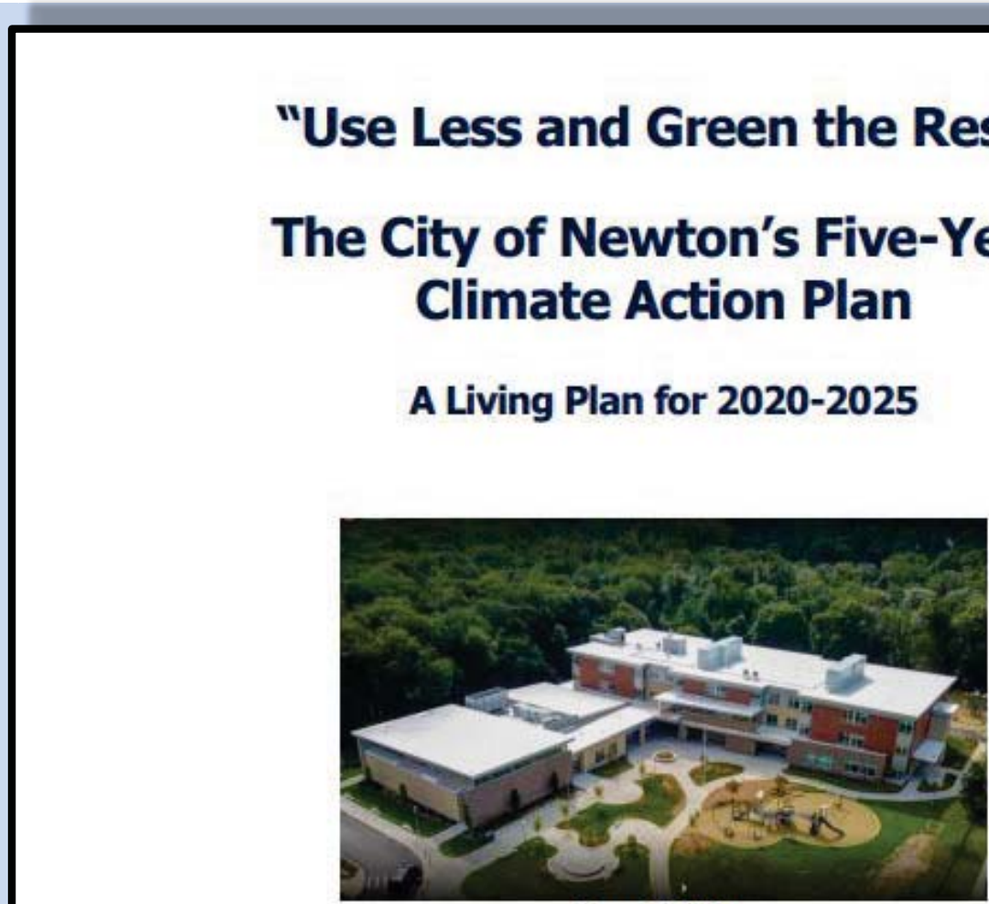
Ex-officio

Halina Brown,
Chair Emerita



Residential Electrification - *A Public Discussion*

Agenda

What's the Challenge?

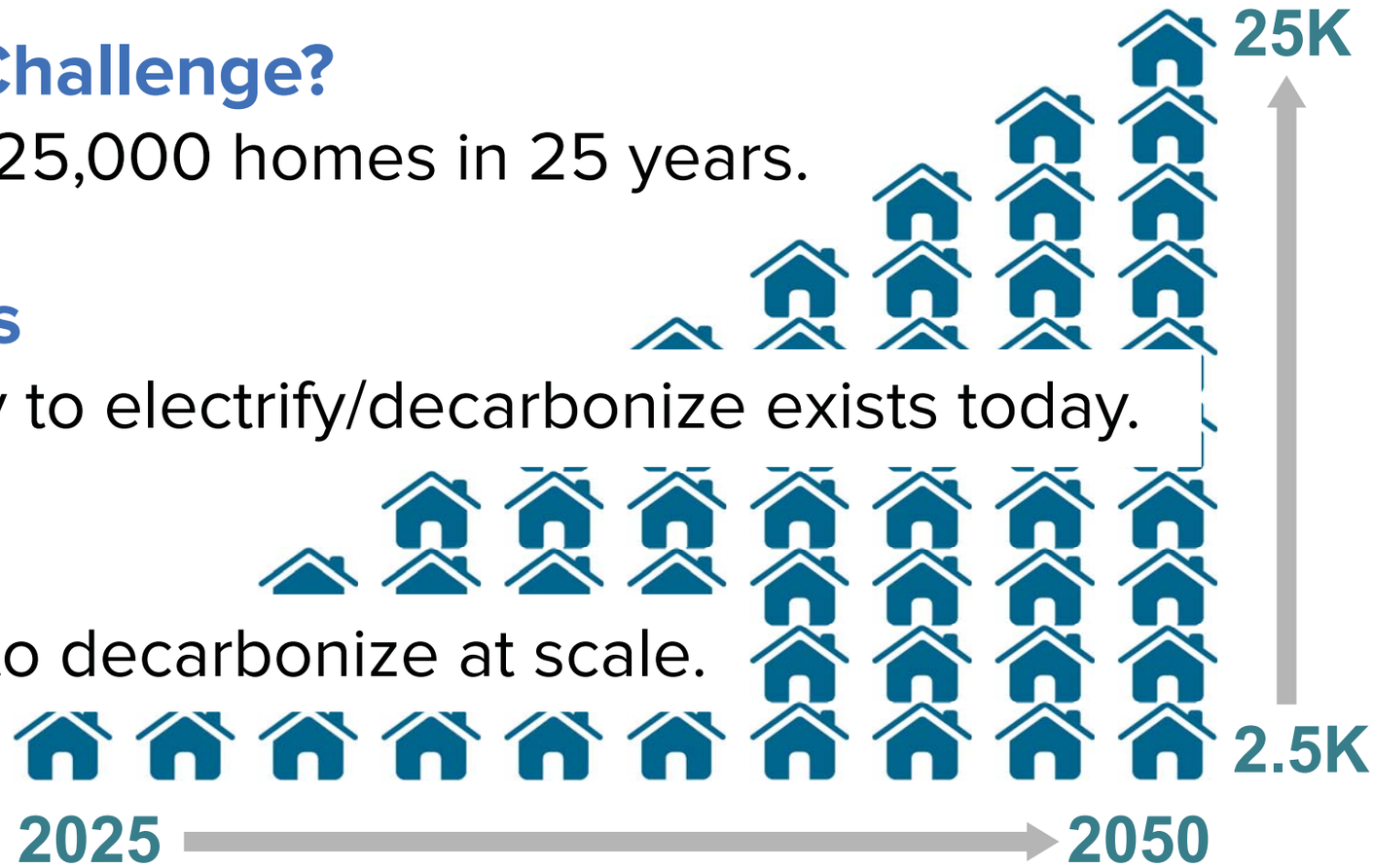
Decarbonize 25,000 homes in 25 years.

Case Studies

The capability to electrify/decarbonize exists today.

Proposals

Mechanisms to decarbonize at scale.



Agenda:

What's the Challenge?

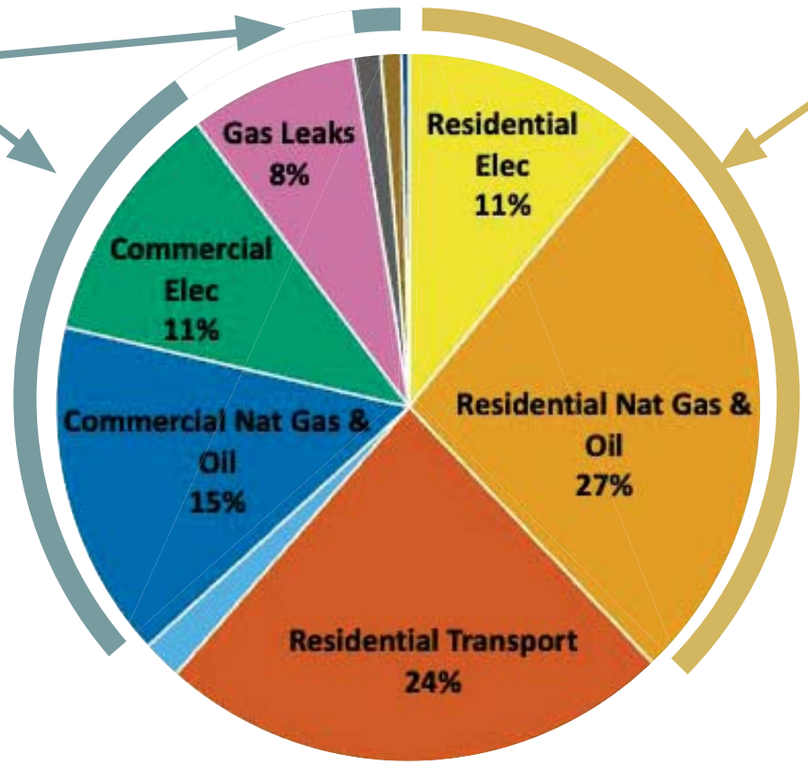
Case Studies

Proposals

Residential Greenhouse Gas Emissions

Commercial & municipal: **28%**

BERDO & Newton Power Choice address



Residential fuel and electric: **38%**

Newton Power Choice addresses electric only

Newton Greenhouse Gas Inventory

Newton Citizens Commission on Energy, 2019

Agenda:

What's the Challenge?

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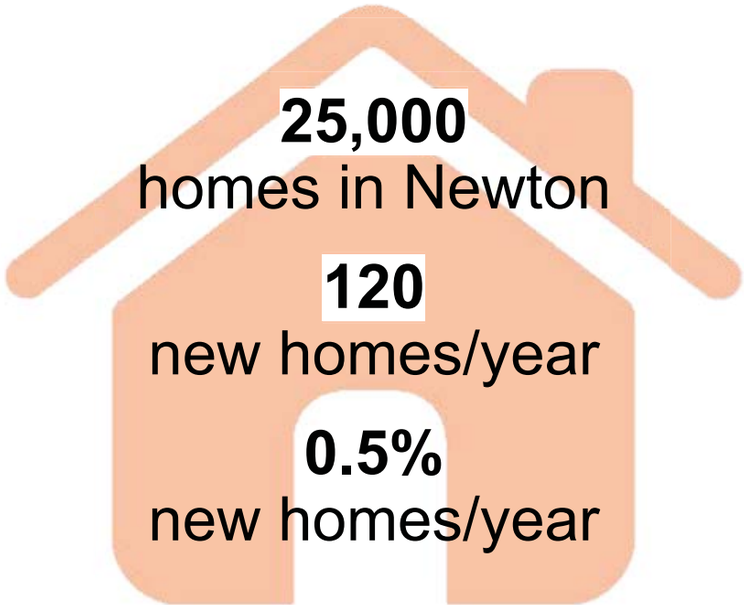
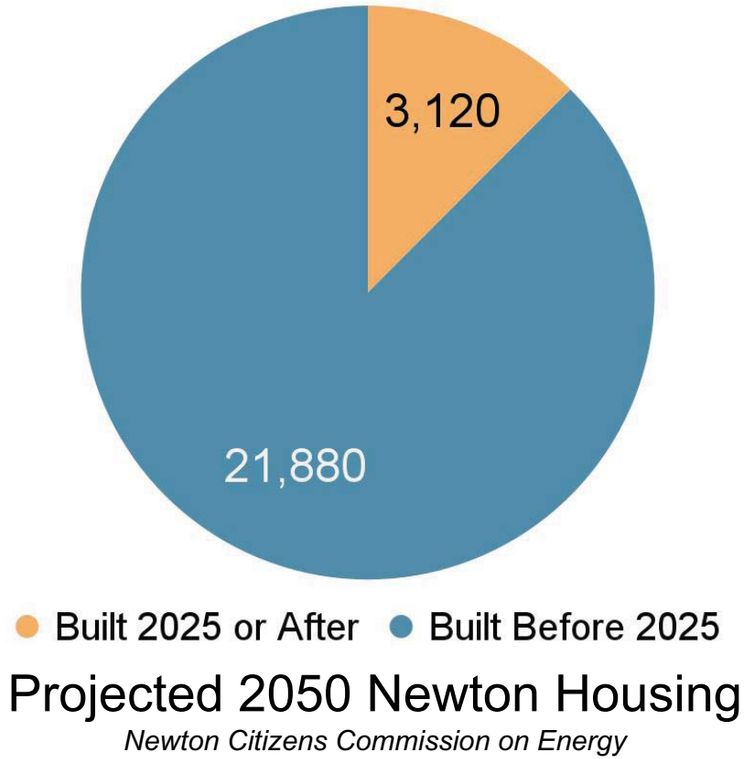
New Construction is NOT the Answer

Our Current Pace Of New Construction…



… Means Only 15% "New" Housing By 2050



Projected 2050 Newton Housing

Newton Citizens Commission on Energy

Agenda:

What's the Challenge?

Case Studies

Proposals

Every Home Can Become Net Zero Carbon

…with the help of a customized plan

Case Study #1

Newton Center Colonial - Background

Safety, space, and values mattered to these owners

Built 1920

2600 square feet

3 Occupants

Original Systems

Oil boiler
Gas hot water
Gas dryer
Gas range
Window AC

*"My childhood **home burned in a gas explosion**.*

*Transitioning from oil would give us a **ton more usable space**.*

*Electrification felt like the **inevitable future of domestic energy**."*

Case Study #1

Newton Center Colonial - Investments

They invested ~$65,000 in equipment over 5 years

2018	2020	2022	2023
Wall insulation (Mass Save) Heat pumps	8.8kW Solar Oil removed	Heat pump water heater Heat pump dryer	Induction cooktop Basement insulation Attic air sealing

$24,101 + $27,181 + $9,300 + $4,700

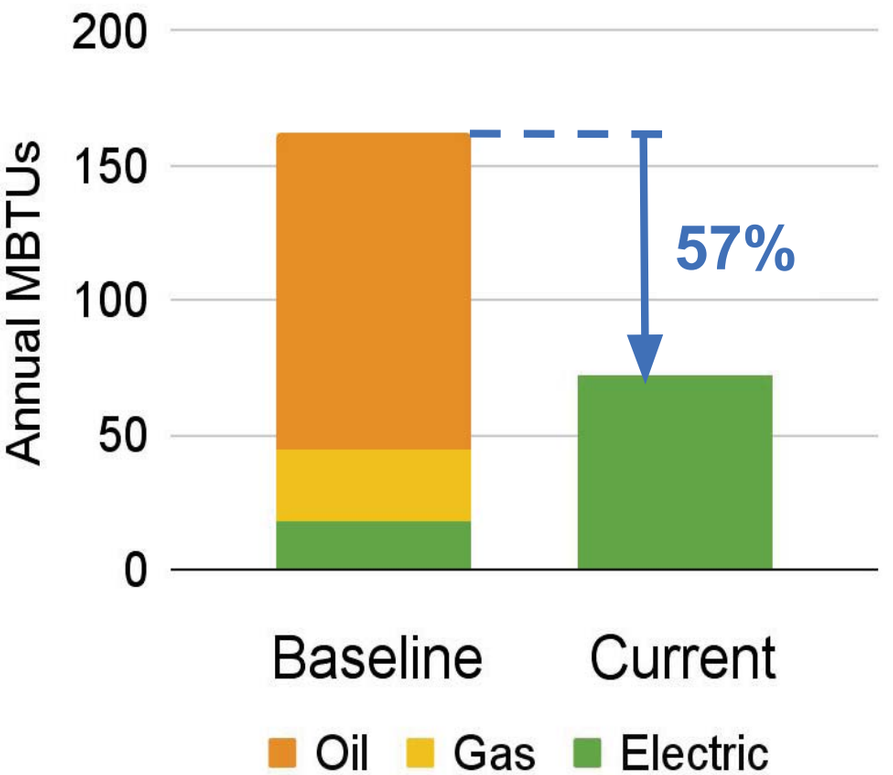
$65,282 total

Case Study #1

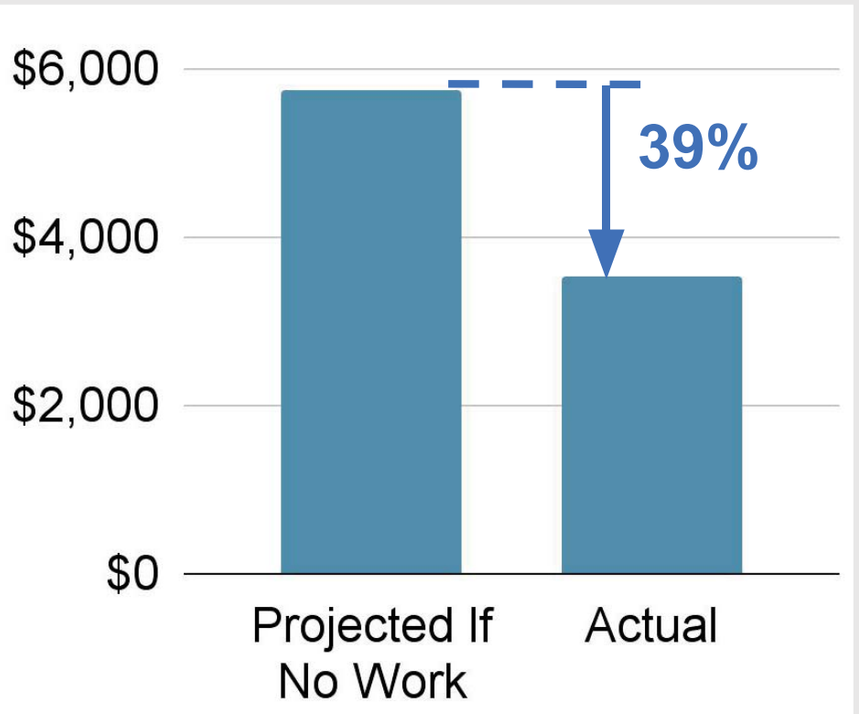
Newton Center Colonial - Results

Energy use dropped 57%, utility expenses dropped 39%

Energy Use



Utility Expenses



Case Study #2

Oak Hill Split Level - Background

Value, equipment condition, and comfort mattered to these owners

Built 1962

2024 square feet

4 Occupants

Original Systems
Oil boiler
Indirect hot water
Central air
Electric range
Electric dryer

*"We wanted to **reduce our environmental impact**.*

*Our heat was loud and our **oil boiler was constantly leaking**.*

*Our **AC was on its last legs**, and it didn't serve the entire house."*

Case Study #2

Oak Hill Split Level - Investments

They invested ~$40,000 in equipment over 4 years

2021	2022	2023	2024	2025
Electric panel Heat pumps	Attic insulation (Mass Save) EV Charger	Wall insulation (Mass Save)	Roof insulation (at air handler) Wall insulation (Mass Save) Ductwork upgrades	Oil removed Water heater Load manager

$22,890 + $1,195 + $6,413 + $9,660

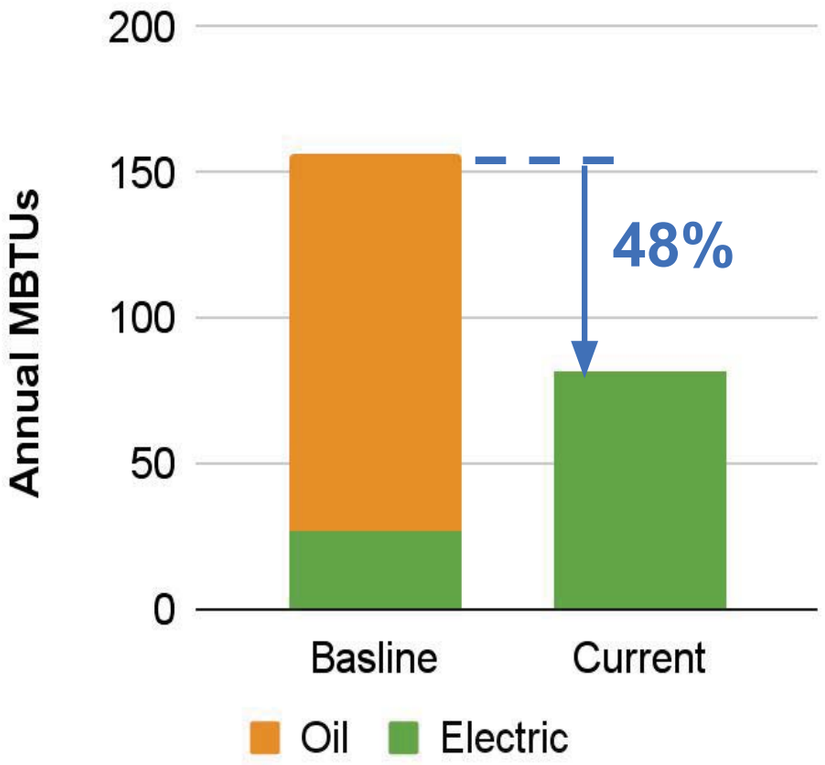
$40,158 total

Case Study #2

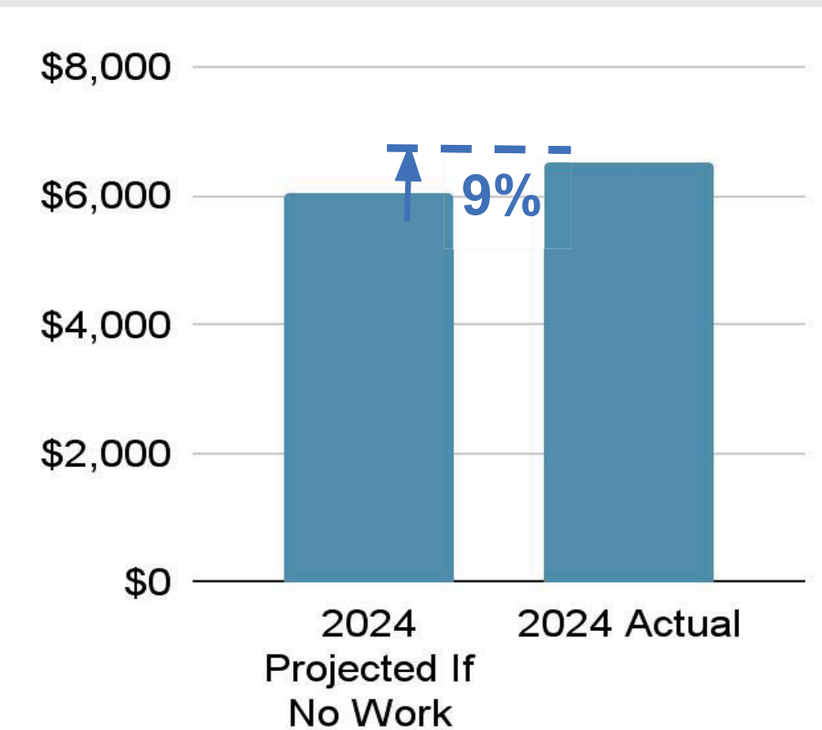
Oak Hill Split Level - Results

Energy use dropped 48%, utility expenses increased 9% – including EV

Energy Use



Utility Expenses



Case Study #3

Nonantum Two-Family, Upstairs Unit

Health, comfort, space & values mattered to this owner

Built 1915

~2000 square feet

1 Occupant

Original Systems
Gas boiler
Gas hot water
No AC
Gas range
Electric dryer

*"I was primarily motivated by **climate change** and a desire for **cooling**.*

*I also wanted **better kitchen air quality** because I have asthma.*

*Without radiators, I can make **better use of my space**."*

Case Study #3

Nonantum Two-family, Upstairs Unit - Investments

~$66,000 in equipment over 12 years

2012-2015	2020	2021-2022	2023-2024
Insulation (Mass Save)	**Heat pumps**	**Heat pump water heater**	**Induction stove**
Windows	**EV Charger**		**Targeted air sealing**
Electric service			**Solar**

$6,000 + $21,700 + $3,200 + $35,500

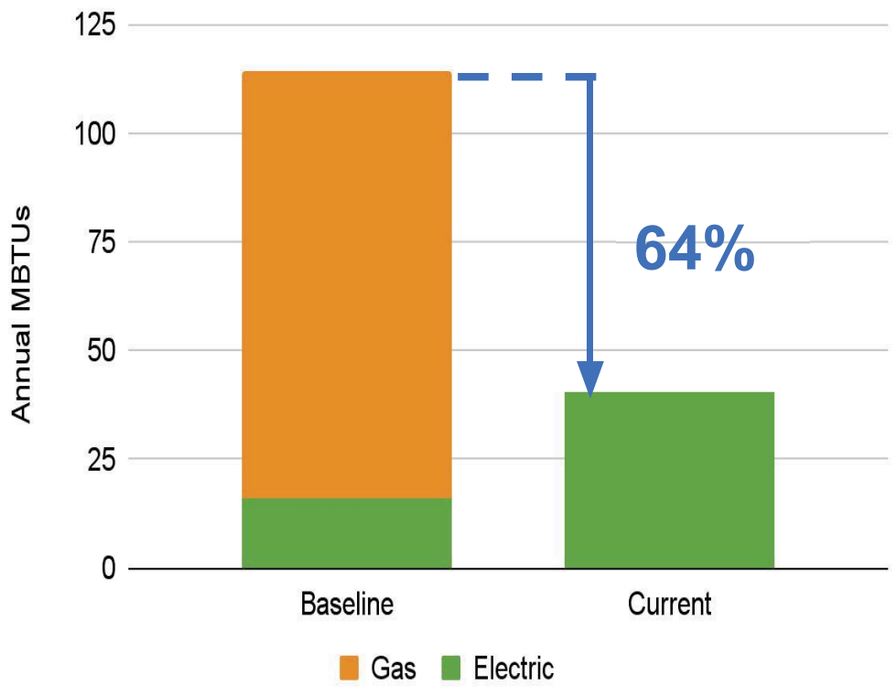
$66,400 total

Case Study #3

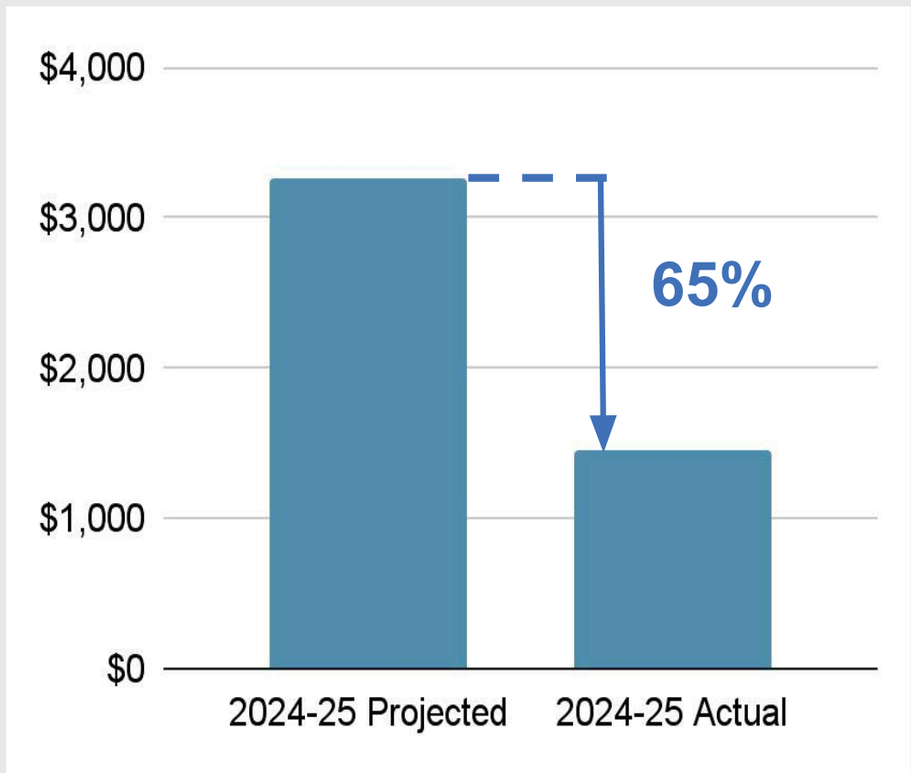
Nonantum Two-family, Upstairs Unit - Results

Energy use dropped 64%, and utility expenses dropped 65% – including an EV

Energy Use



Utility Expenses



Case Studies Takeaways

Every home can go all-electric

No matter the age, style, or occupancy

Electrification should be coupled with efficiency

To ensure comfort and minimize utility expenses

Planning is key to success

Maximizes impact and avoids missed opportunities

The Current State of the Art

The Technology Is Up To The Job, and The Electric Grid Is Ready Now.

Heat Pumps are ready to meet efficiency, environmental, and convenience goals.

- **Cold weather performance** has improved dramatically, with heat pumps still working efficiently down to -20°

- **Variable speed motors** improve heat pump efficiency and comfort
- **Advanced A2L refrigerants** lower the global warming potential from heat pumps
- **New air-to-water heat pumps** permit homes with hydronic heat distribution to electrify without installing ducts

Eversource will still invest $4.5B in electric operations and $1B in clean energy enablement.

Increase available electrification hosting capacity by **180%** over the next decade

Supports the adoption of **2.5M** electric vehicles statewide, **60%** of the state's 2050 goals.

Allows for the adoption of **1M** heat pumps, **70%** of the state's 2050 goal in our service area.

Enables **5.8 GW** of solar, exceeding the state's 2040 goals, and over **60%** of the 2050 goals.

Agenda:

What's the Challenge?

Case Studies

Proposals

Proposals for Council Action

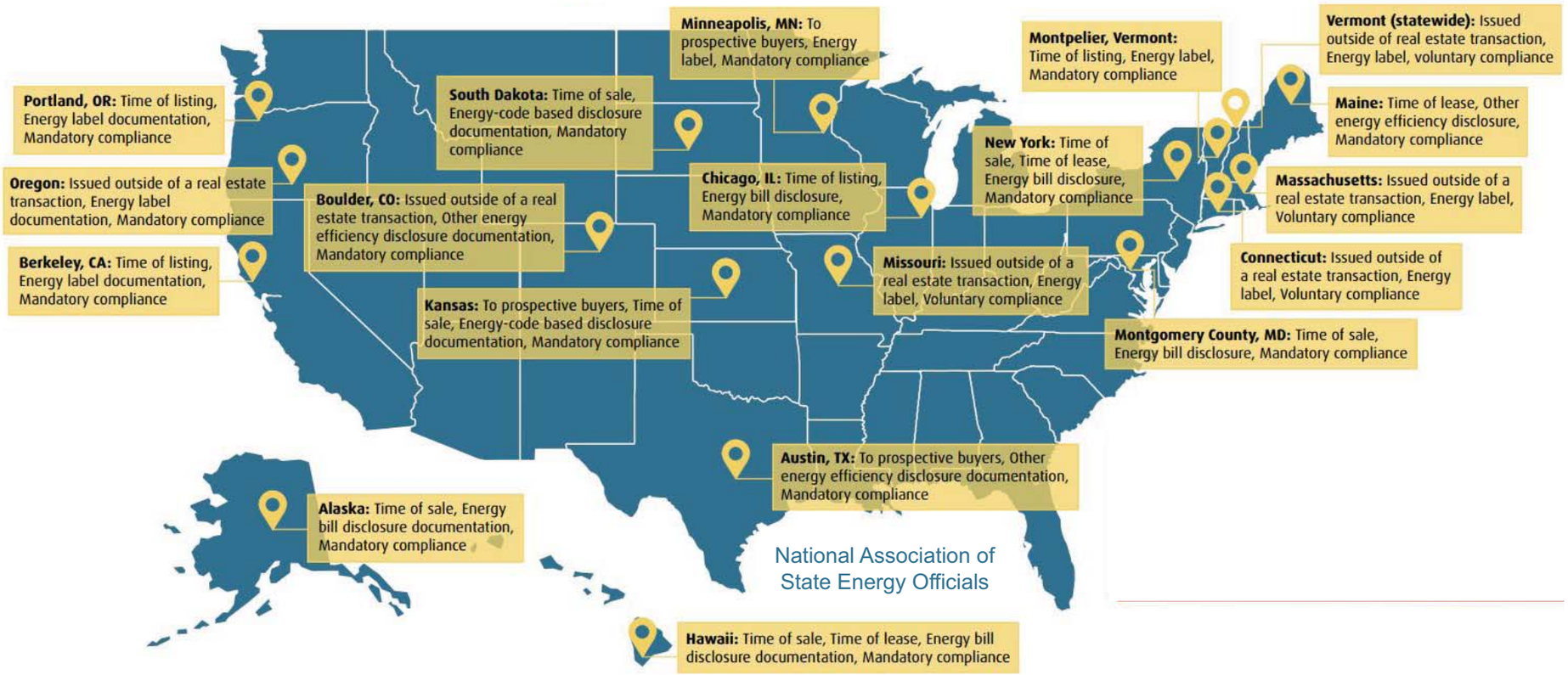
1 Adopt Energy Use Reporting for All Dwellings

2 Strategically Decommission Gas Lines [and electrify homes through NPA's instead]

Proposal #1
Background

Home Energy Use Reporting Is Growing

Residential Energy Use Reporting Policies



Programs have focused on reporting at time of sale or rent…

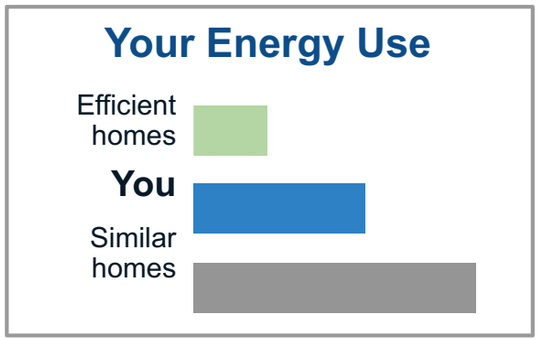
…which is too late in the process.

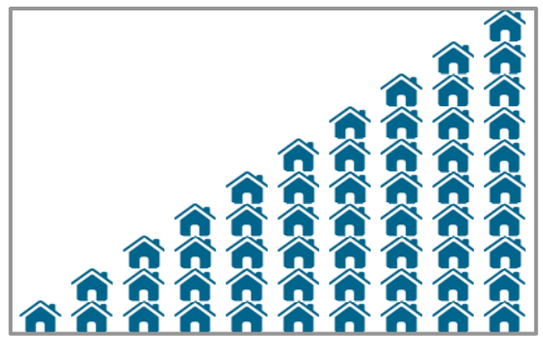
Proposal #1

Adopt Energy Use Reporting For All Dwellings

Data that's **always available** facilitates improvement planning

2018	2020	2022
Wall insulation	8.8kW solar	Heat pump water heater
Heat pumps	Remove oil	Heat pump dryer





Proposal #2 Background

NPA's are projects that avoid gas infrastructure replacement and reduce greenhouse gas emissions.

The DPU is not just allowing NPA's, they're **encouraging** them.

How Gas Pipeline Replacements Work In Newton

Current Process:

1. NGrid proposes replacements.
2. City reviews, but cannot reject.
3. DPU reviews and, lacking options, approves.
4. Pipes replaced @ $5.7M/mile.

Proposed Process:

*City assesses all streets for **NPA** fit.*

1. NGrid proposes replacements.
2. Those on fit list default to NPA, NGrid can contest.
3. DPU approves preferred option.
4. Approved NPA projects are electrified.

Proposal #2
Background

Pipeline replacement

National Grid's cost to replace Garland's pipe

Garland elec

Cost to electrify Garland's 10 bldgs based on actual current conditions

Average elec

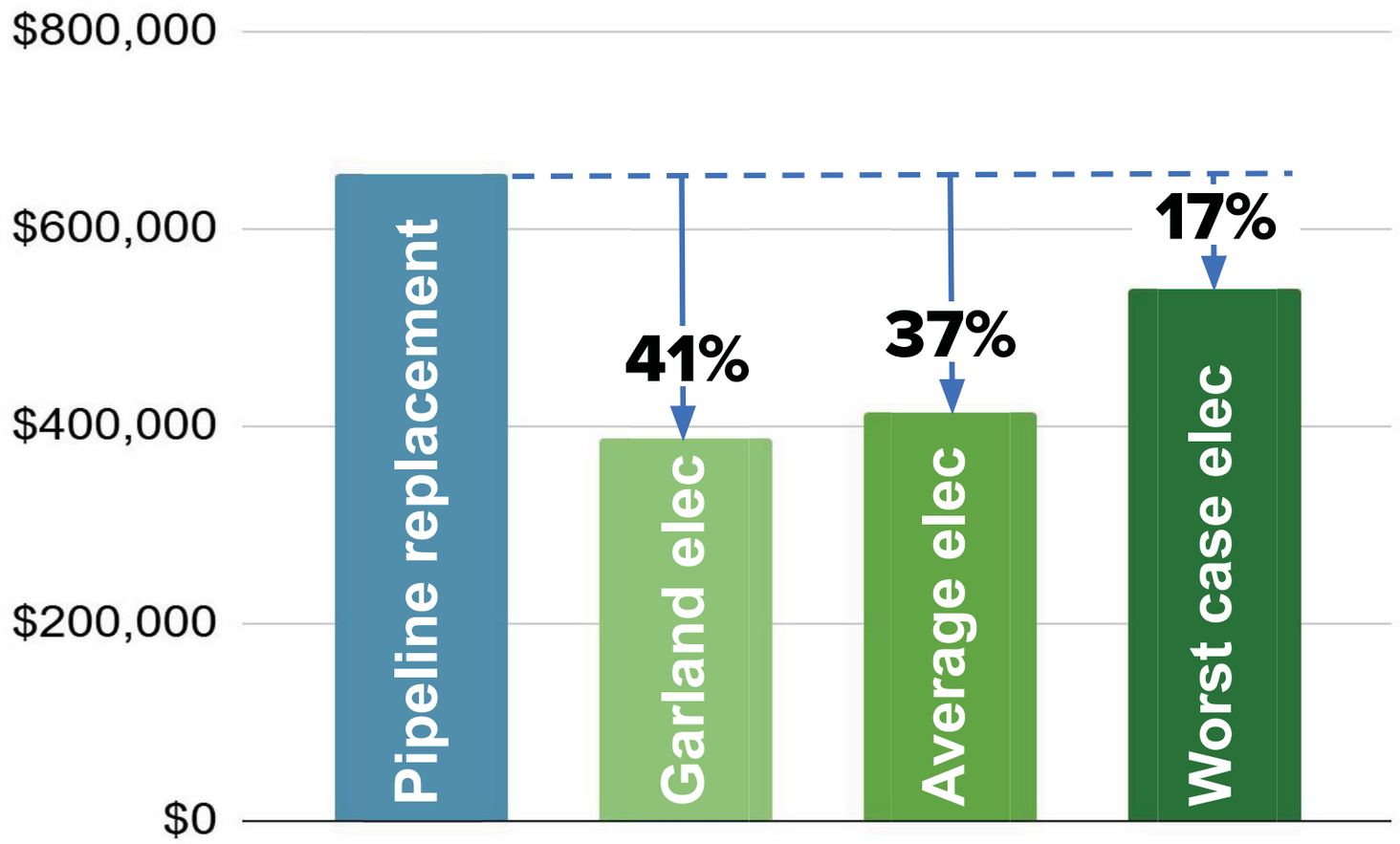
Cost to electrify 10 homes based on average electrification adoption rates

Worst case elec

Cost to electrify 10 homes assuming no electrification currently in place

Electrification Can Create Significant Savings

Capital Cost Comparisons For Garland Road



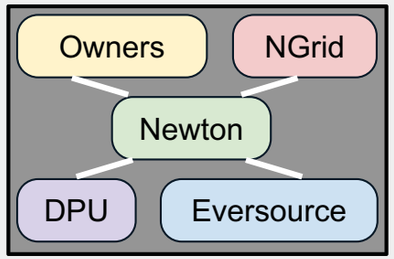
...in addition to $655K in long-term net carbon savings.

Proposal #2

Strategically Decommission Gas Lines

Establish NPA criteria & map streets

Pilot neighborhood decommissioning



Create an operational plan

Agenda:

What's the Challenge?

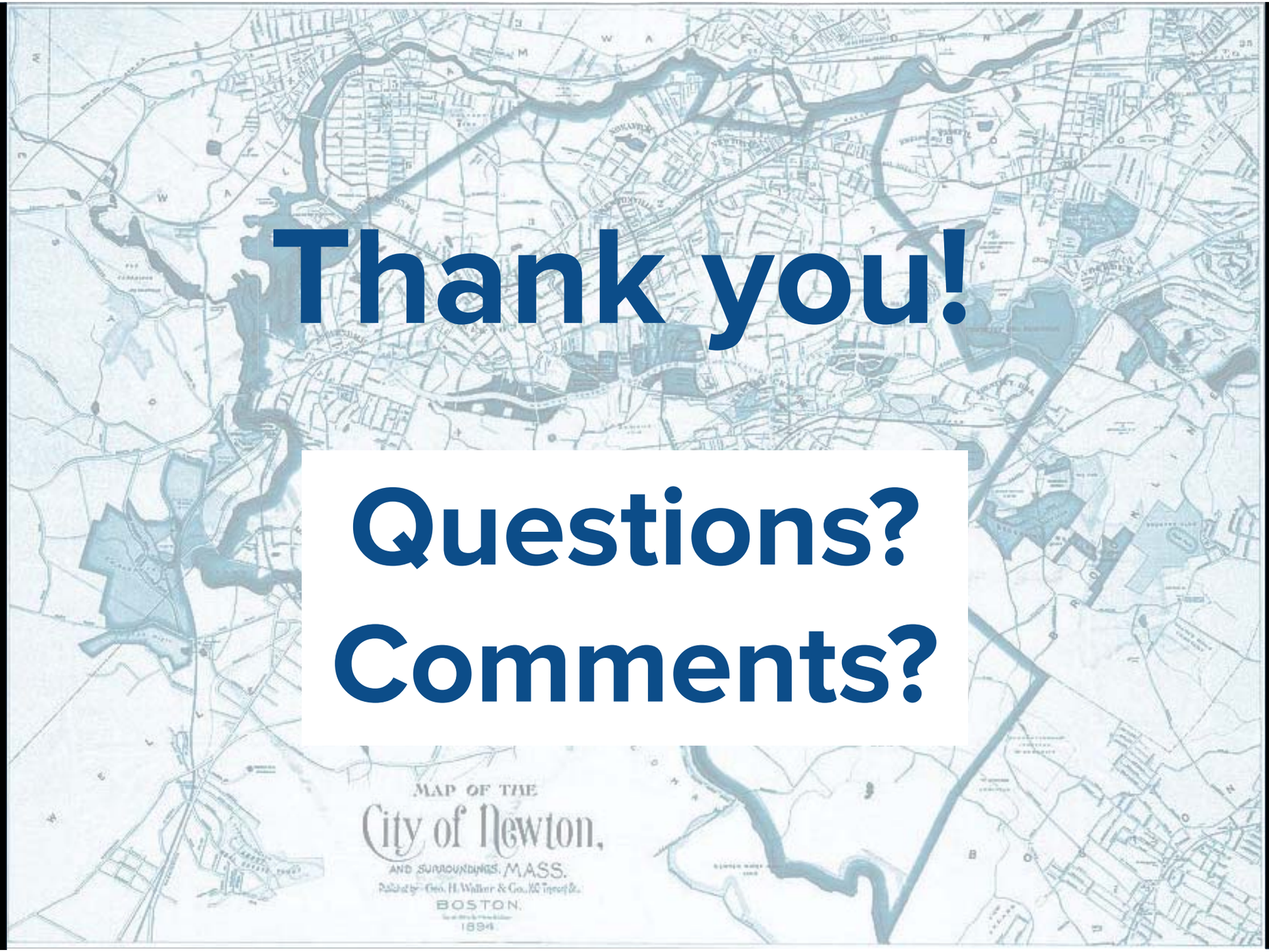
Case Studies

Proposals

Where to Start?

1 **Develop an energy use reporting requirement for all residential buildings.**

2 **Establish the criteria for identifying which streets make for desirable NPA projects.**



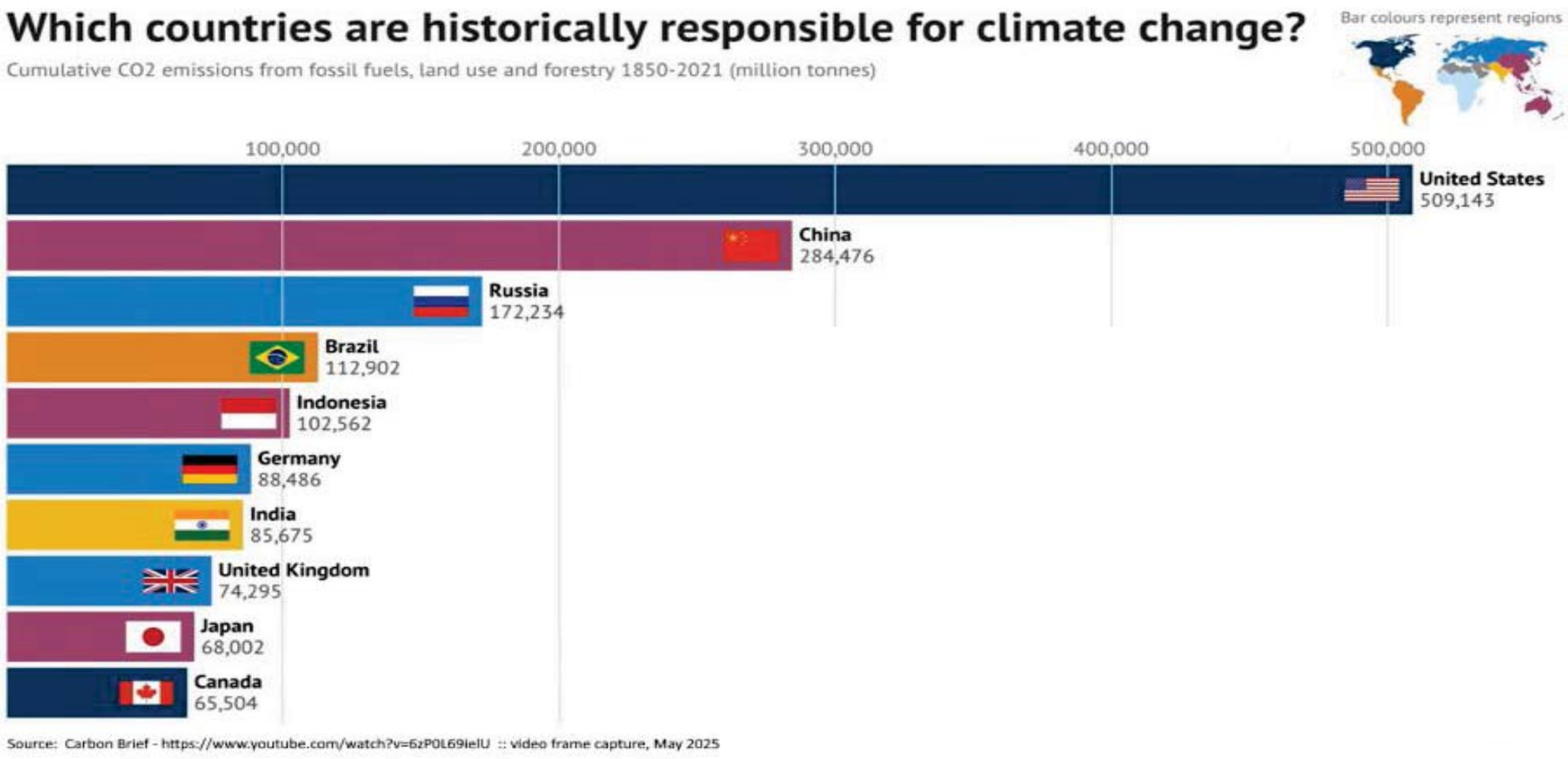
Thank you!

Questions?
Comments?

FAQ:

Isn’t The Real Problem Emissions from China?

The US has a history of disproportionately contributing to climate change:



CCPI
Climate Change
Performance Index

Yet the CCPI, a global index that compares progress on climate, ranks the US 57th out of 63 countries.