



# Equity and Buildings Electrification

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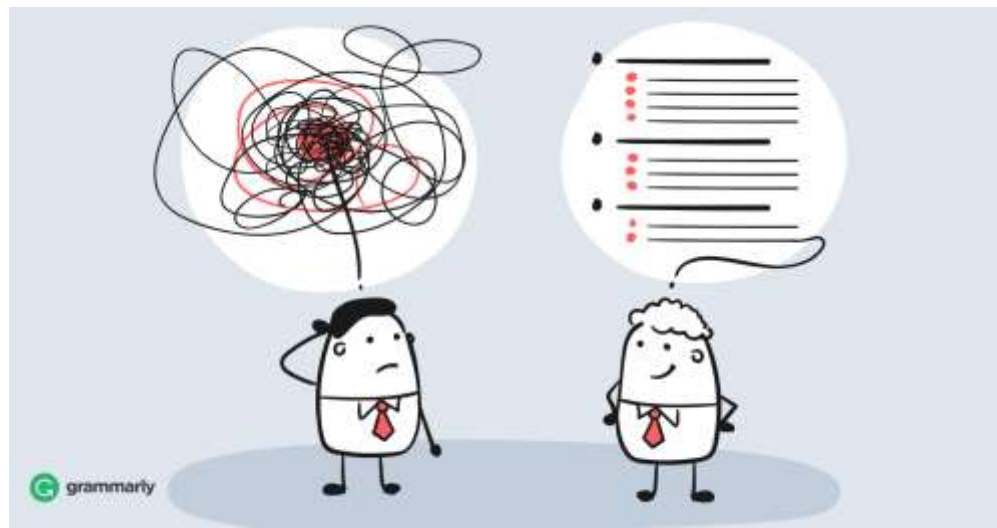
**American Council for an Energy-Efficient Economy**

**Presentation at NASEO Winter Policy Outlook, Energy Equity Task  
Force**

**February 4, 2020**

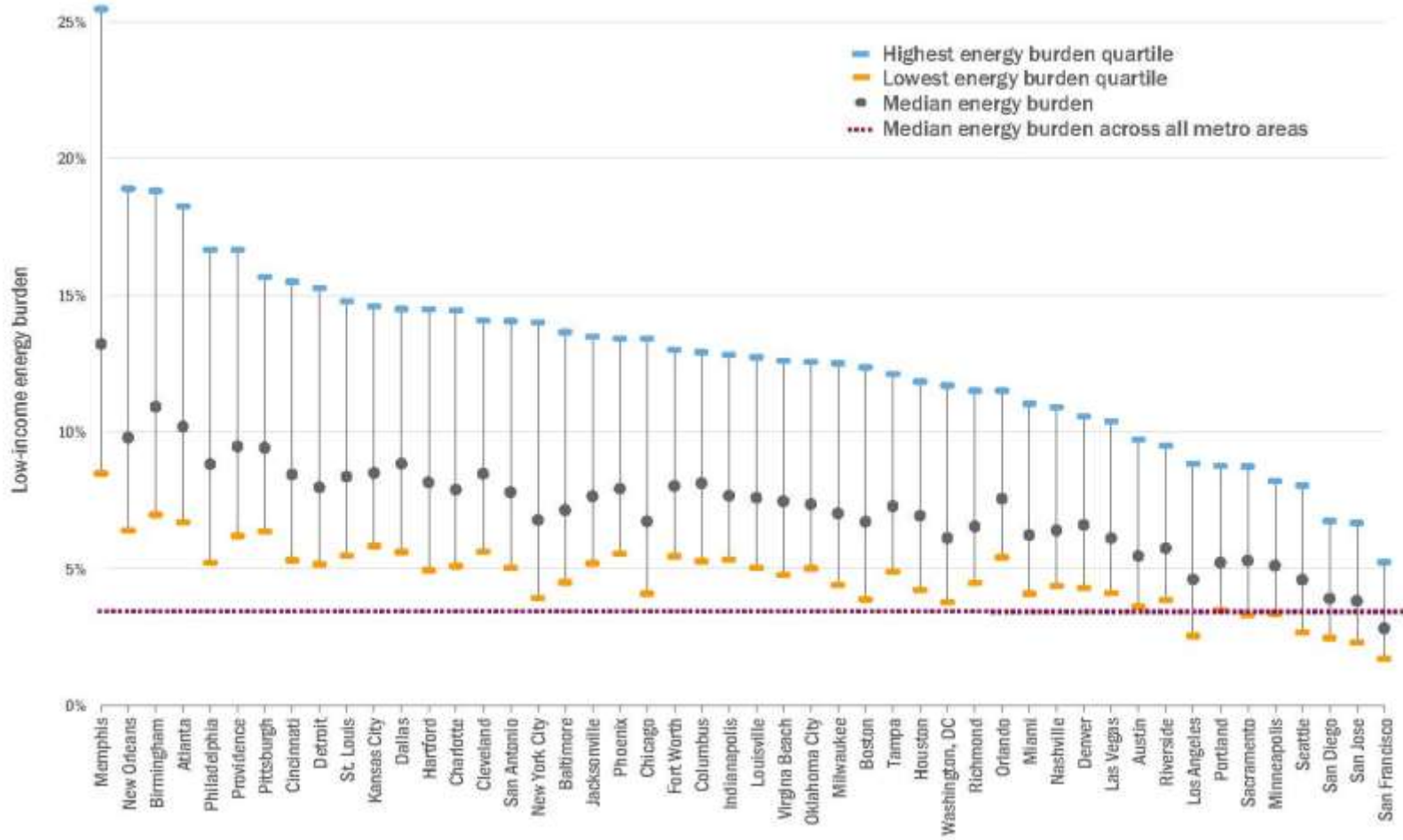
# Outline

- Energy burdens
- Electrification: Why now?
- Relationship between electrification energy efficiency
- Equity considerations
- State strategies



# Energy Burdens

# Range of energy burdens for low-income households



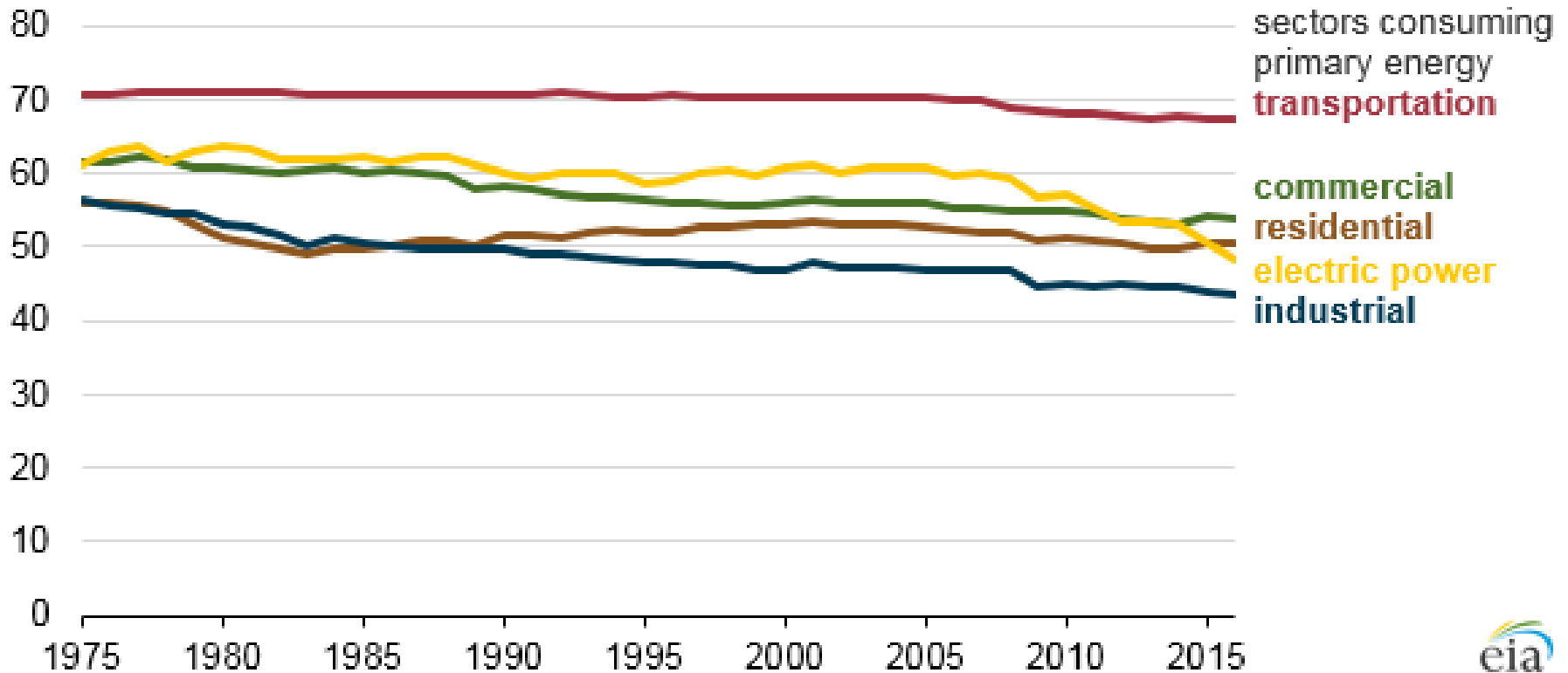
# Energy efficiency can help alleviate energy burdens

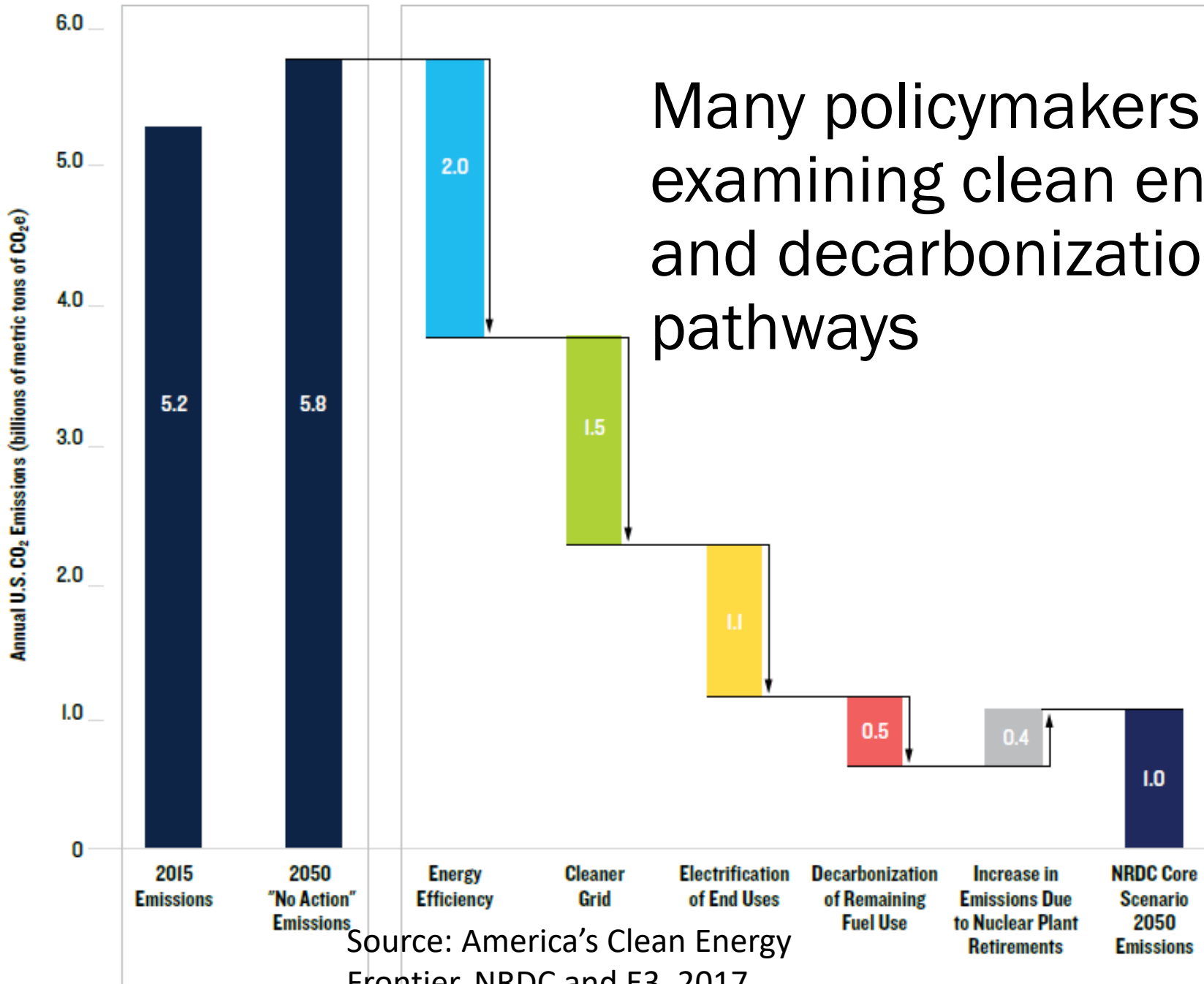
- Some states are beginning to set energy affordability goals w/ EE as a key policy
- About one-third of states spend more than 10% of customer-funded EE portfolios on low-income EE
- Strategies to increase investment in low-income EE:
  - **Set requirements for low-income program spending, savings, and/or participation**
  - **Establish alternative cost-effectiveness rules for low-income programs (e.g., adding non-energy benefits, exempting LI programs, program adders, lowering CE thresholds)**
  - **Adopt best practices for low-income program design and implementation**

# Electrification: Why now?

# Electricity is getting cleaner as emissions intensity declines; technology has improved

U.S. carbon intensity of energy use by sector (1975-2016)  
kilograms carbon dioxide per million British thermal units



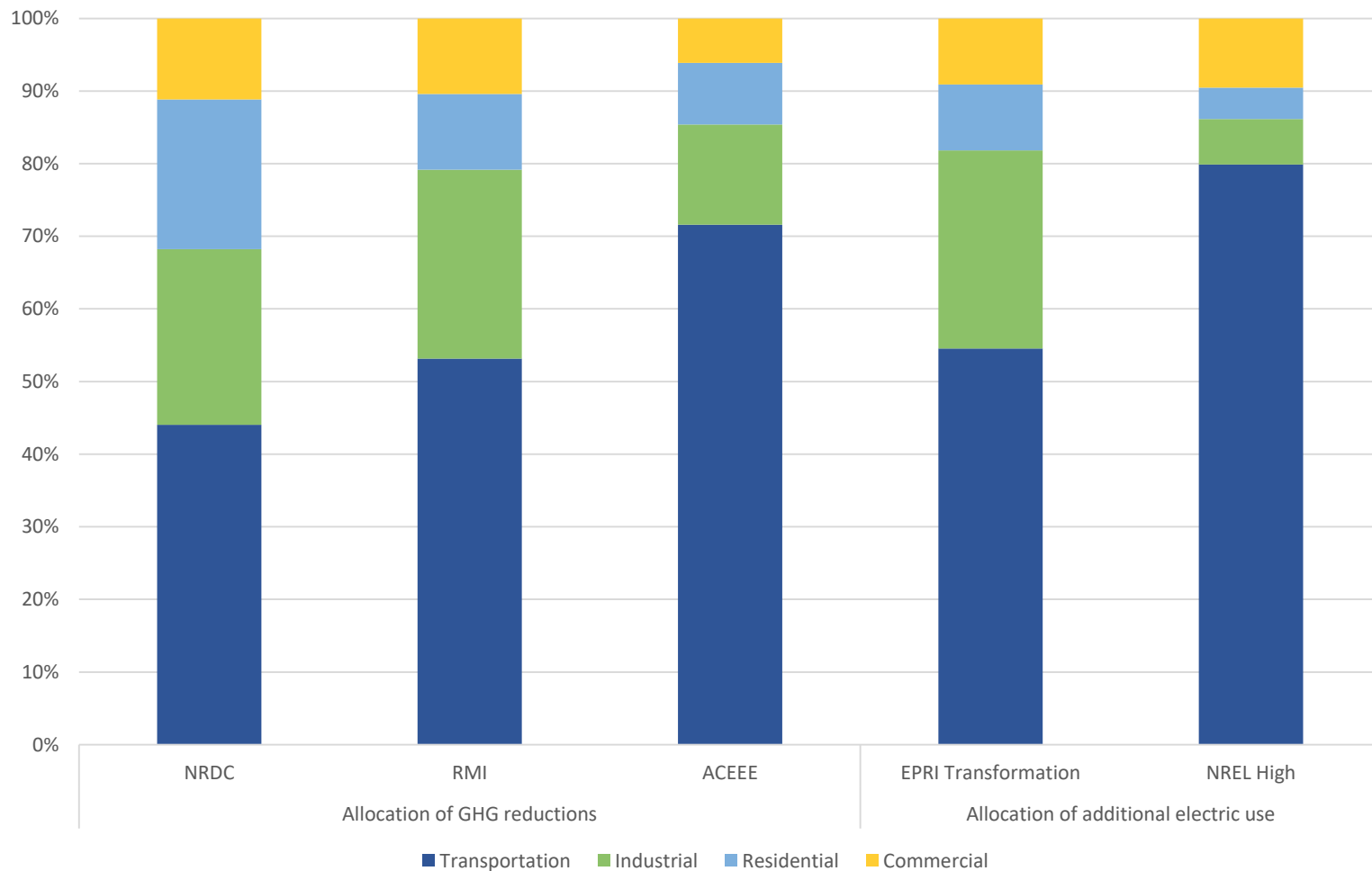


Many policymakers examining clean energy and decarbonization pathways

Source: America's Clean Energy Frontier. NRDC and E3, 2017



# Allocation of Electrification Potential



Source: Nadel, ACEEE, Oct. 2019 blog looking at studies by NRDC, NREL, EPRI, RMI and ACEEE

# Beneficial electrification and energy efficiency

# Some definitions

**Electrification** is a form of fuel switching that either fully or partially displaces direct fossil fuel use with electricity use, e.g. moving from an oil or gas furnace to electric heat pumps;

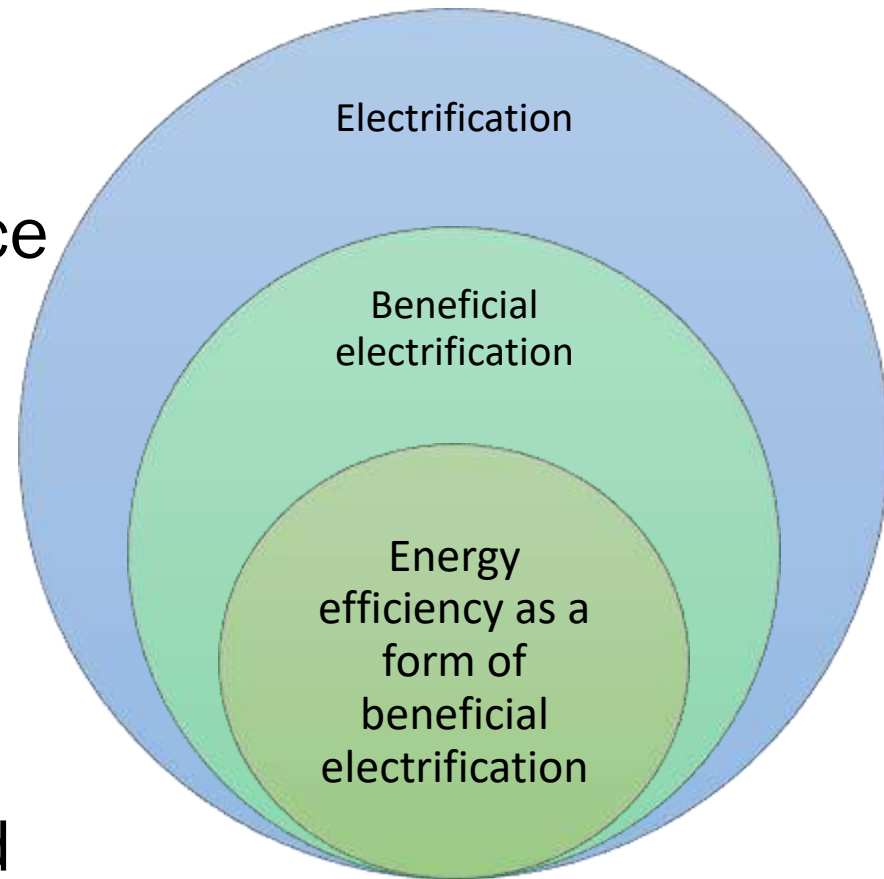
**Beneficial electrification (BE)** (or strategic electrification): electrification that provides societal benefits, e.g. by reducing overall emissions, energy & customer costs and improving grid management



# Beneficial electrification is a form of energy efficiency when it meets three criteria:

1. Saves total energy in source Btu's
2. Saves consumers money
3. Reduces emissions

BE often means shifting to energy-efficient technologies, e.g. electric vehicles (EVs) and high-efficiency heat pumps



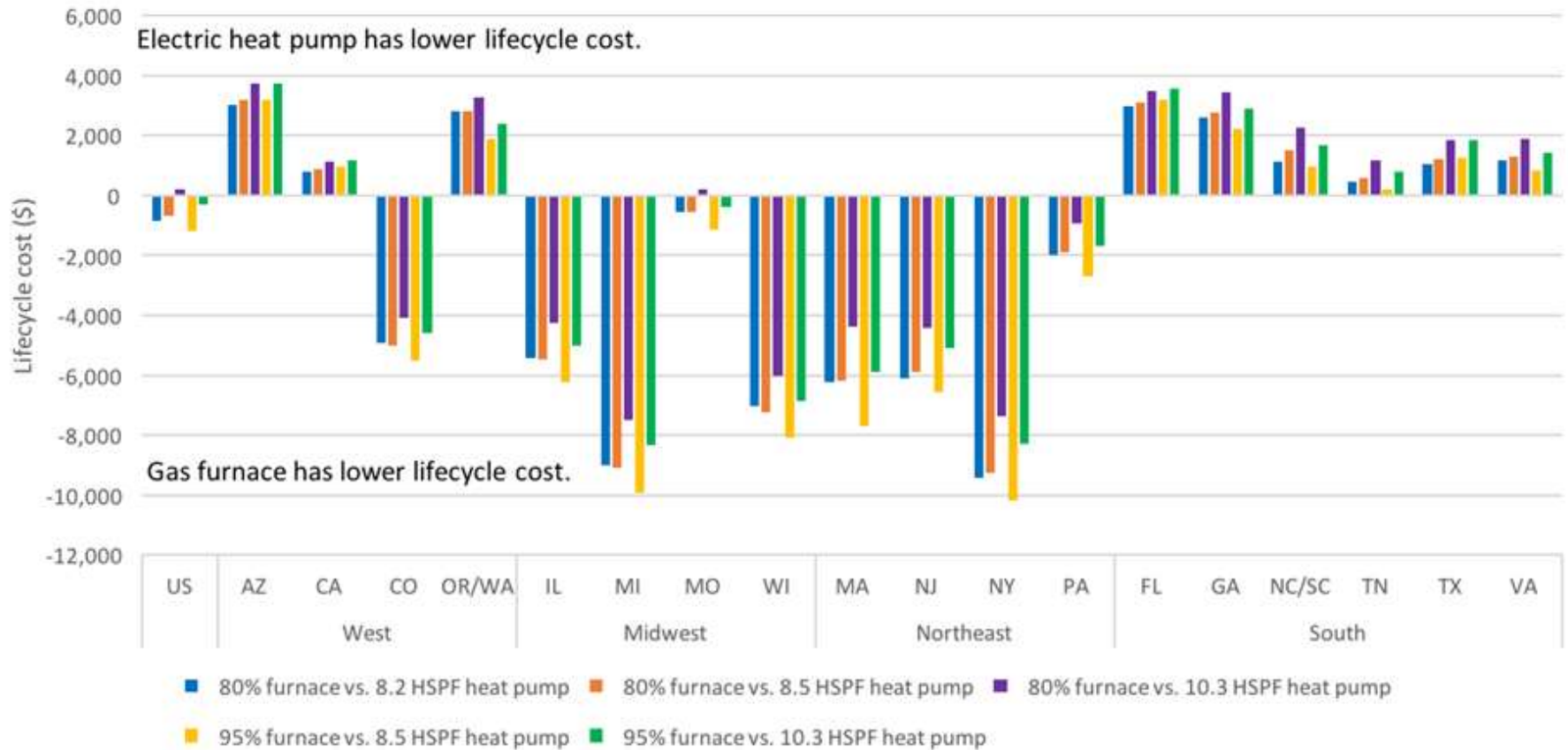
# Key Equity Considerations: Costs, Community Engagement & Participation

# ACEEE research on consumer paybacks of switching from oil or propane to heat pumps

Comparison	Average simple payback period (years)				
	US	West	Midwest	Northeast	Southeast
Oil furnace (83% AFUE) vs. HP (8.5 HSPF), includes AC savings	0.9	1.4	1.3 in MO; no savings in Upper MW	1.9	0.8
Propane furnace (80% AFUE) vs. HP (8.5 HSPF), includes AC savings	1.5	1.7	3.4 in MO; no savings in Upper MW	2.0	1.3
Oil boiler (86% AFUE) vs. ductless HP, without AC	4.4	7.3	18.8	6.2	5.1
Propane boiler (84% AFUE) vs. ductless HP, without AC	16.1	12.1	19.8	8.5	9.1
Std. oil water heater to HPWH (2.0 rated EF)	Immediate		Examined only at a national level		
Std. propane water heater to HPWH (2.0 rated EF)	3.9				

Note: Payback periods are typically longer relative to natural gas systems.

# Lifecycle Cost Economics – Gas Furnaces vs. Heat Pumps (2016 study- snapshot of conditions then)



Source: Nadel 2016, *Comparative Energy Use of Residential Gas Furnaces and Electric Heat Pumps*, ACEEE

# Considerations for equity and energy efficiency





# Recent state policy example: New York

- NY PSC order sets energy efficiency and buildings electrification goals; additional investments of \$2 billion toward EE and heat pump initiative (Jan. 2020 order)
- Developing a statewide LMI Portfolio (state and utilities)
- At least 20% of residential efficiency funding must be allocated to dedicated disadvantaged communities including low- to moderate-income (LMI) (Climate Leadership and Community Protection Act – CLCPA)
- Affordability Program targeted at limiting energy burdens to 6%

# Principles and Strategies

principles  
when  
considering  
the role of  
beneficial  
electrification

- Decarbonization opportunities from electrification vary by customer or building type, region and over time
- Electrification criteria and potential should be analyzed under local conditions
- Align equipment programs with whole-building/whole-house upgrades to reduce energy demands, e.g. staged programs
- Electrification costs generally lower if done when existing equipment fails and needs to be replaced

## Strategies states can pursue

- Assess how equity is defined in your state and set goals
- Collect data and analysis on
  - Energy burdens and current policy landscape, e.g. income-eligible energy efficiency programs
  - Costs and benefits of program options, e.g. energy efficiency and buildings electrification potential studies
- Engage stakeholders early and often: Incorporate equity at the beginning of policy and program discussions
- For LMI households, grants and low-cost loans will likely be needed

# Additional Resources

- ACEEE Blog post: [Electrification and Efficiency: Crafting an Enduring Relationship](#)
- Energy Efficiency For All and Greenlining Institute, Sept. 2019: [Equitable Buildings Electrification: A Framework for Powering Resilient Communities](#)
- EESI Report: [Equitable Beneficial Electrification for Rural Electric Cooperatives](#)