U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Evolving Building Policies for a Resilient, Efficient Future

National Energy Codes Conference Seminar Series

Building Technologies Office

Fall 2020

NECC Seminar Series Lineup

Catch the entire lineup of sessions weekly—Thursdays @ 1p ET:

- 10/01: Kickoff to the Series
- 10/08: Electronic Permitting
- 10/15: HVAC for Low-Load Homes
- 10/22: Performance-Based Compliance
- 10/29: 2021 IECC Commercial
- 11/05: Remote and Virtual Inspections
- 11/12: New for ASHRAE Standard 90.1
- 11/19: 2021 IECC Residential
- 11/24: Energy Codes Around the World
- 12/03: Advanced Technology and Codes
- **12/10: Policies for EE + Resilience**
- 12/17: Field Studies in the NW Region

> Learn more: energycodes.gov/2020-building-energy-code-webinar-series

Building Energy Codes
U.S. DEPARTMENT OF ENERGY

Evolving Building Policies for a Resilient, Efficient Future

John Balfe, NEEP

Building Energy Code Seminar Series

Today's Webinar

Introductions

Speaker Panel

Discussion

Poll Question #1

In what region of the United States are you located?

- West
- Southwest
- Midwest
- Northeast
- Southeast

Poll Question #2

Which most closely aligns with your profession?

(Select one option only)

- Architect/Engineer
- Building/Trades Professional
- Code Official, Plan Reviewer, 3rd Part Verifier
- NGO, Non-Profit, Consultant
- University, Federal, State, Local Government

Today's Speakers

Andy Winslow
Public Policy Associate
NEEP

Kathryn Wright
Building Energy Programs Director
USDN

Jim Meyers
Buildings Program Director
SWEEP

Leah Louis-Prescott
Associate
RMI

Policy and Program Trends in the Northeast

Andy Winslow
Northeast Energy Efficiency Partnerships
November 18, 2020

Northeast Energy Efficiency Partnerships

"Assist the Northeast and Mid-Atlantic region to reduce building sector energy consumption by at least 3% per year and carbon emissions by at least 40% by 2030 (relative to 2001)"

Mission

We seek to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities.

Vision

We envision the region's homes, buildings, and communities transformed into efficient, affordable, low-carbon, resilient places to live, work, and play.

Approach

Drive market transformation regionally by fostering collaboration and innovation, developing tools, and disseminating knowledge

Building Decarbonization → 3 Key Elements

Advanced Electric Technologies

Space/Water Heating – Heat Pumps

Deep Energy Efficiency

Thermal Improvements

Grid Integration

Flexible use of Low-Carbon Electricity

Northeast Strategic Electrification Action Plan – NEEP 2018

Building Decarb Policy and Programs

- Carbon neutral targets via legislation
- Heat pump adoption Targets/Goals
- Benchmarking , Labeling, and Standards
- Building Codes & Appliance Standards
- Lead-by-Example
- Workforce Development
- Supporting communities

Policy Trends: Carbon and Energy Efficiency Goals

Carbon Neutral Reduction Goals

- Aligned with the International Panel on Climate Change (IPCC) reports

Passed

Climate leadership and Protection Act

Net Zero through:

- Carbon Reductions
- Carbon Offsets
  - Capture
  - Land use management

Introduced

An Act Establishing a Green New Deal

An Act Setting Next Gen Climate Policy

Relating to State Affairs and Government – Resilient Rhode Island Act of 2014

New York: Climate Leadership and Community Protection Act

(A.8429)

- Carbon Neutral by 2050
  - 85% GHG reduction
  - 15% Carbon offsets
- 100% Renewable Electricity

35% overall benefits must be received by disadvantaged communities

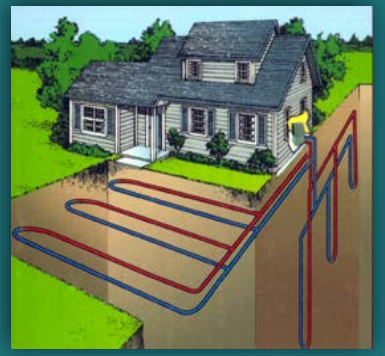
Strategic Electrification

Heating Electrification Technologies

Technologies

- Air-Source Heat Pumps
- Ground-Source Heat Pumps
- Solar Thermal

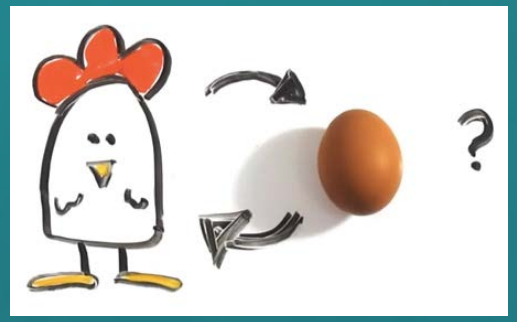





- Trends
  - Evolving metrics
  - Heat pump carve-outs
  - Community-level engagement

Electrification Challenges

Cold Climate



Transforming Markets

Cost Effectiveness and Funding

Electric and Gas Rates

Thank You!

Andy Winslow
Public Policy Associate
Northeast Energy Efficiency Partnerships
awinslow@neep.org

Evolving Building Policies for a Resilient, Efficient Future

Building electrification, zero-energy or zero-carbon codes, and electrification-readiness in the Southwest

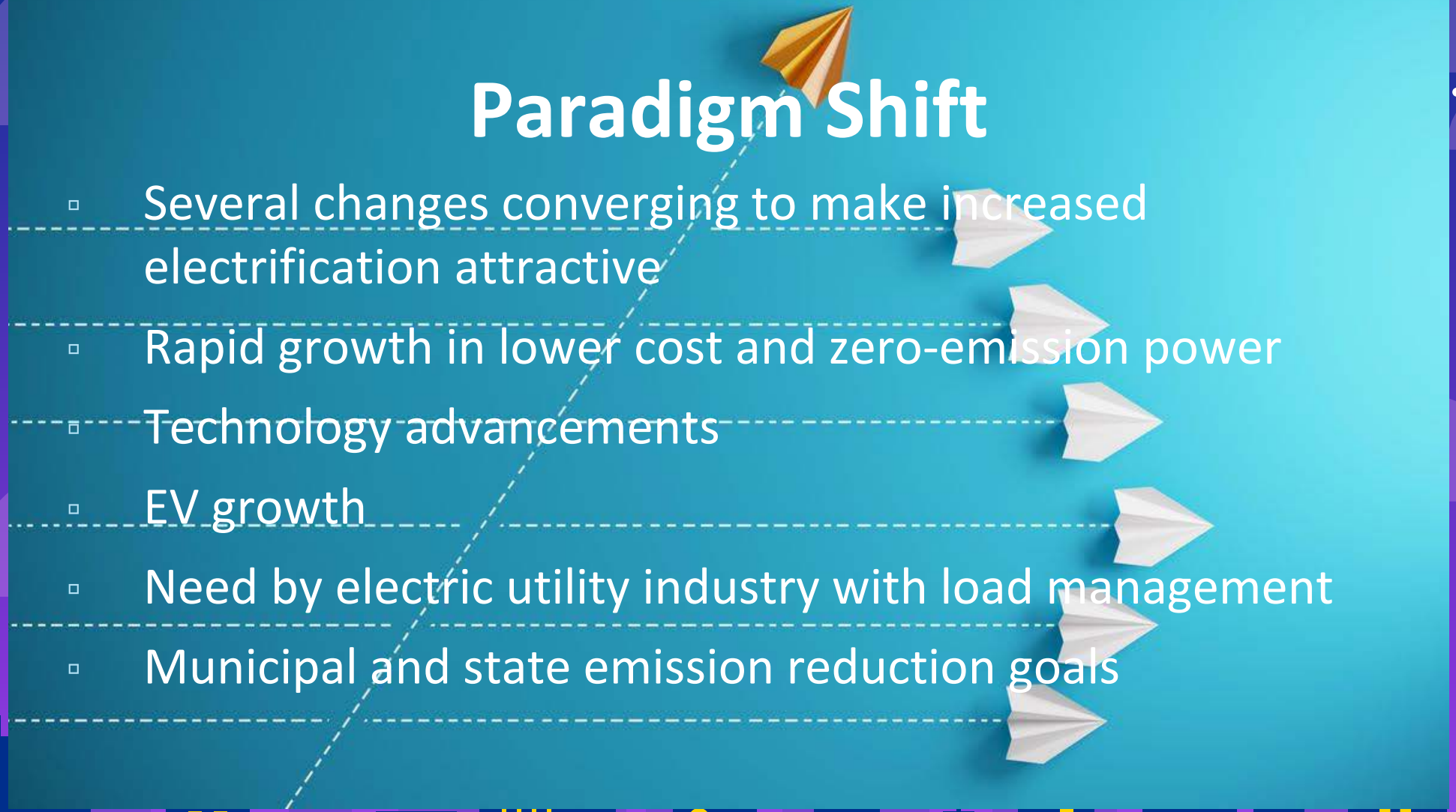
2020 Building Energy Code Seminar Series

The Southwest Energy Efficiency Project (SWEEP) promotes greater energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming.

Jim Meyers
Director of Buildings Programs
Southwest Energy Efficiency Project

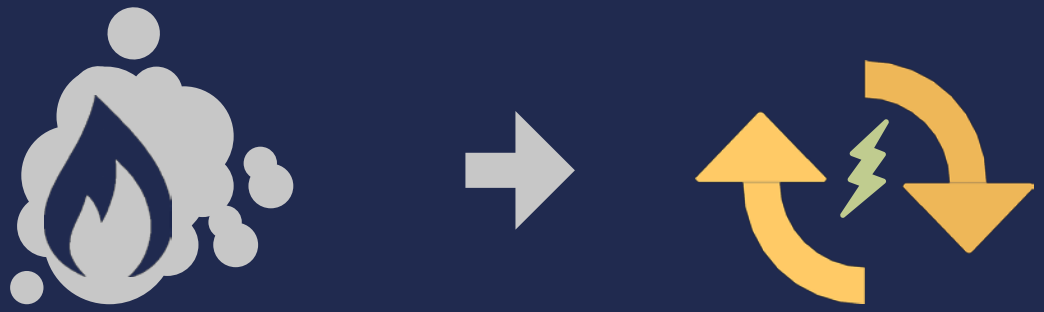
Paradigm Shift

- Several changes converging to make increased electrification attractive
- Rapid growth in lower cost and zero-emission power
- Technology advancements
- EV growth
- Need by electric utility industry with load management
- Municipal and state emission reduction goals



Graphic courtesy of Forbes

Defining Building Electrification



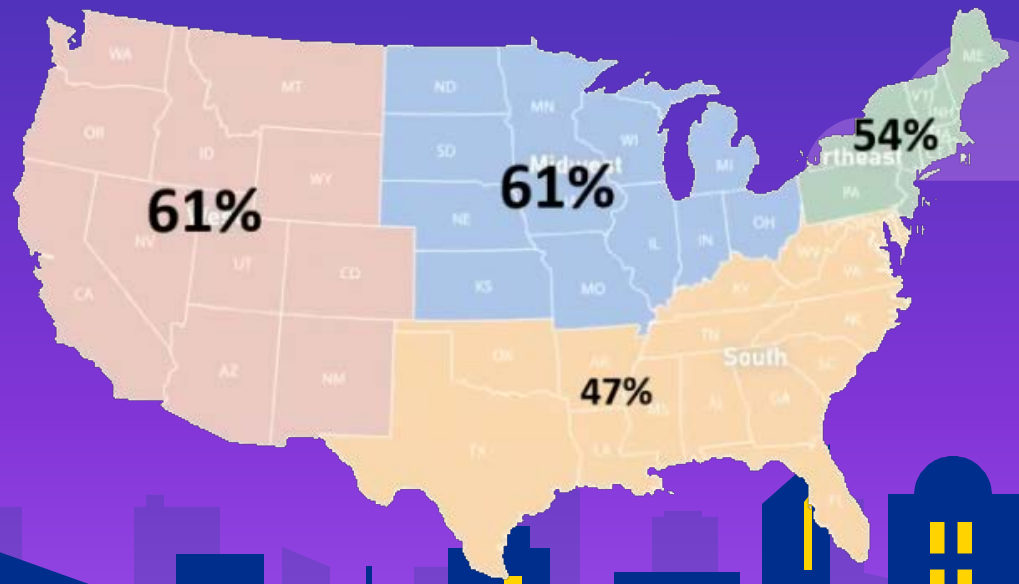
Electrification means upgrading appliances and equipment that would otherwise use natural gas/propane—such as furnaces, water heating, stoves, and clothes dryers—to clean and efficient electric versions.

Defining Building Electrification

- Building heating systems
- Water heating systems
- Cooking appliances
- Clothes drying
- Transportation

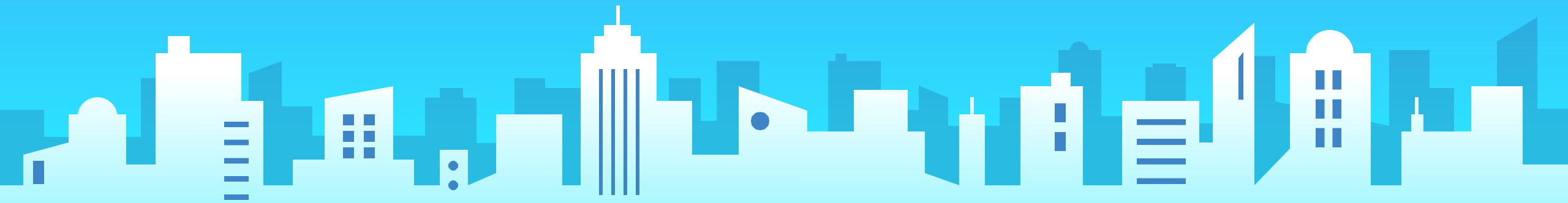
Building Electrification

- Gas or non-gas enthusiast
- Any respondent who has preference for gas over electric for one of the following:
  - Cooktops
  - Water Heaters
  - Central heating



Building Electrification

- Interest in electrification seen at municipal level
- Cities and counties implementing policies across US
- Requests for information
- A format easily digestible by non-technical
- Increase in climate policies locally



Building Policy Approaches

Six approaches to electrification

The Process

- Sustainability plan
- Building and sustainability departments
- Support of council/commission
- Extensive outreach to building industry

  Architects, engineers, homebuilders, building owners, developers, apartment industry, trades and mfrs
- Timeline, roadmap, to reach goals
- Ongoing collaboration for built environment

A Spectrum of Building Code Options

INCENTIVES: Rebates, expedited permitting, reduced permit fees

ELECTRIC READY: Pre-wiring and panel capacity for future electric systems

ELECTRIC-PREFERRED: Extra efficiency or renewable requirements for new construction with natural gas

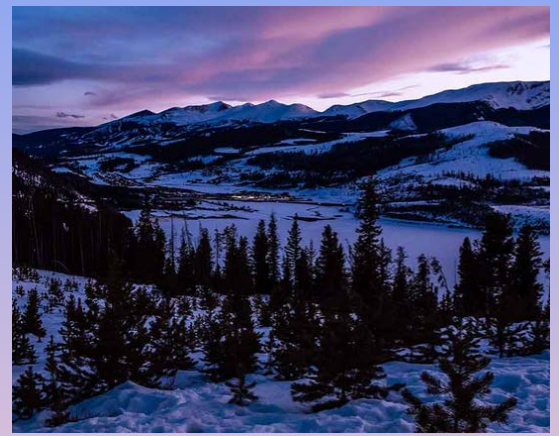
BUILDING TYPE SPECIFIC: All electric for certain types of buildings

ELECTRIC-ONLY WITH EXCEPTIONS: Requiring, for instance, electric heating and water heating but allowing gas stoves

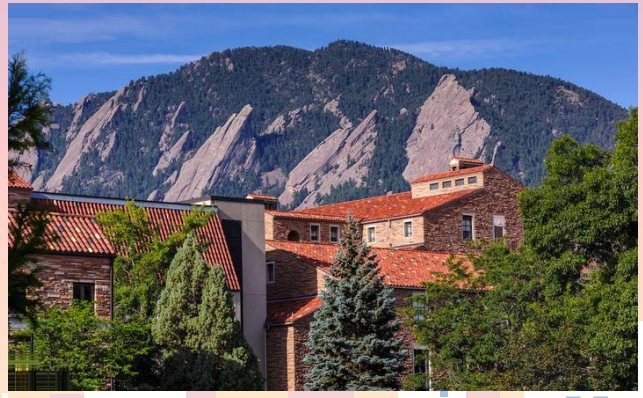
ELECTRIC-ONLY: No fossil fuels allowed in new construction

Examples from the Southwest

- Summit County
- EV charging required
- Zero Energy Ready Home required



- Boulder
- On path to zero
- New homes >5,000 SF must be net zero
- Requires on-site renewable energy to also offset natural gas consumption

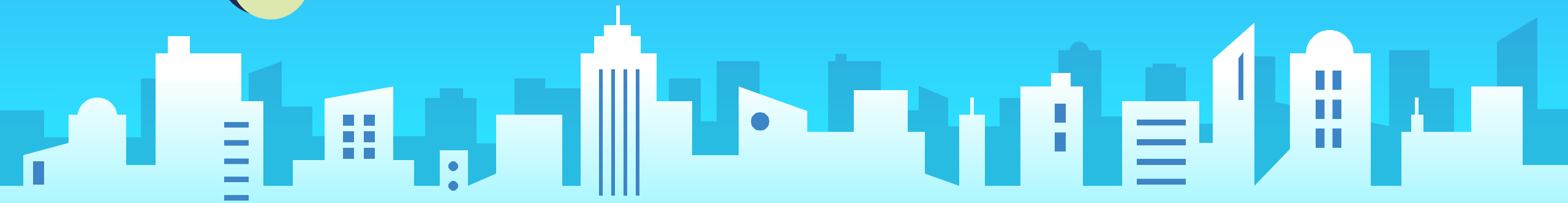


Examples from the Southwest

- Denver
  - Set policy to reach net zero energy by 2035 through building codes
  - EV charging required
  - Stretch code incentives
  - Next code cycle to incorporate current stretch code incentives includes Passive House and ZERH
  - Solar ready required for commercial buildings – reserved space and conduit
  - Continuously burning pilot lights not allowed
  - Reduced ERI

RECOMMENDATIONS

- If not ready for all-electric, adopt **ELECTRIC-PREFERRED.** It adds some increased efficiency requirements for fossil fuel homes and buildings.
- **AT A MINIMUM**, at least adopt **ELECTRIC-READY** so homes and buildings are pre-wired for when the owner wants to convert all or some appliances to electric.
- Start with Zero Energy Ready Homes for residential construction.



Thanks!

Jim Meyers,

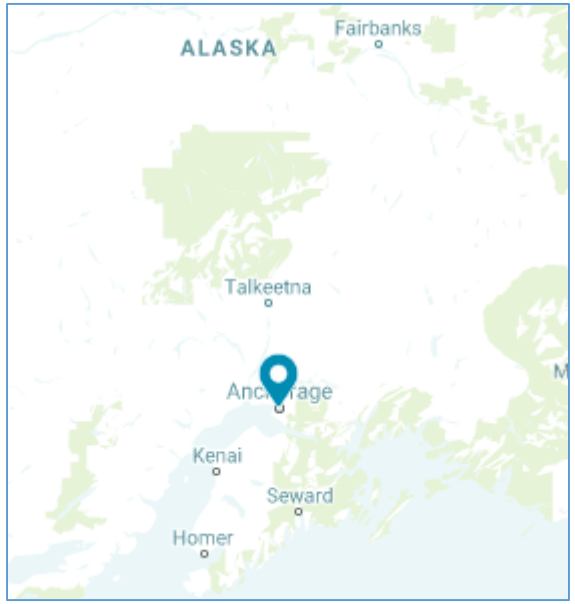
jmeyers@swenergy.org

Emerging Trends Building Energy Policy

Connecting People. Fostering Innovation.

USDN | urban sustainability directors network

ABOUT USDN



USDN Members

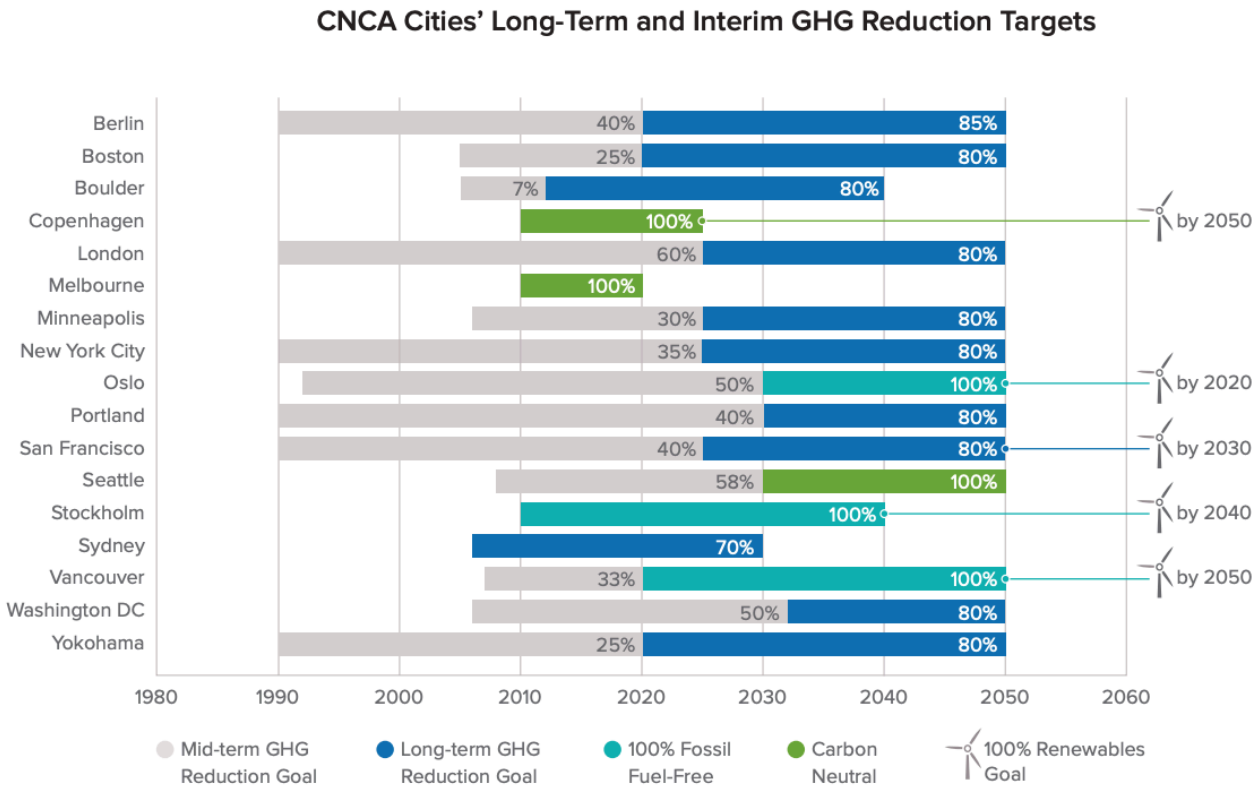
USDN.org

POLL QUESTION #3

Has your city, town or county taken local action in the built environment? Local action could be city-run retrofit program, green zoning, net zero building planning, codes changes or some other form of local government action.

- **Yes**
- **No**
- **I'm not sure**

GHG AMBITIONS



CNCA: Framework for Long-term Deep Carbon Reduction Planning

USDN.org

GHG AMBITIONS

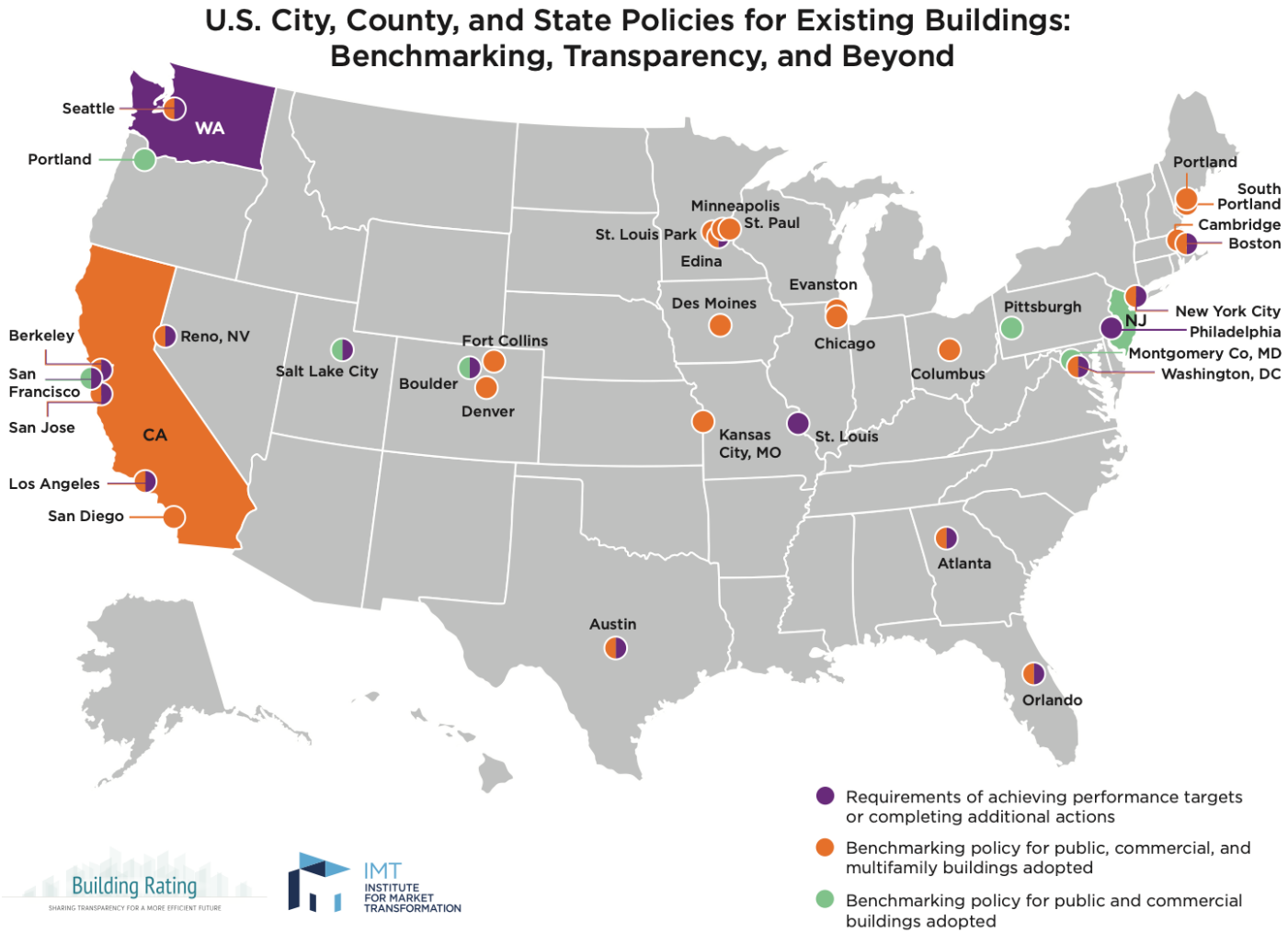
SYSTEM	PERCENTAGE OF C40 CITIES WITH "STRONG POWER" TO...			
	Own/Operate	Set/Enforce Policies	Control Budget	Set Vision
Energy Supply	27%	32%	15%	25%
Energy Efficiency	57%	68%	29%	39%
Transportation	53%	54%	35%	44%
Waste Management	53%	56%	35%	44%

Source: C40, "Powering Climate Action" hyperlink: http://c40-production-images.s3.amazonaws.com/other_uploads/images/295_Powering_Climate_Action_Full_Report.original.pdf?1435760139

POLICY ACTION

Benchmarking

SUSTAINED INTEREST IN BENCHMARKING



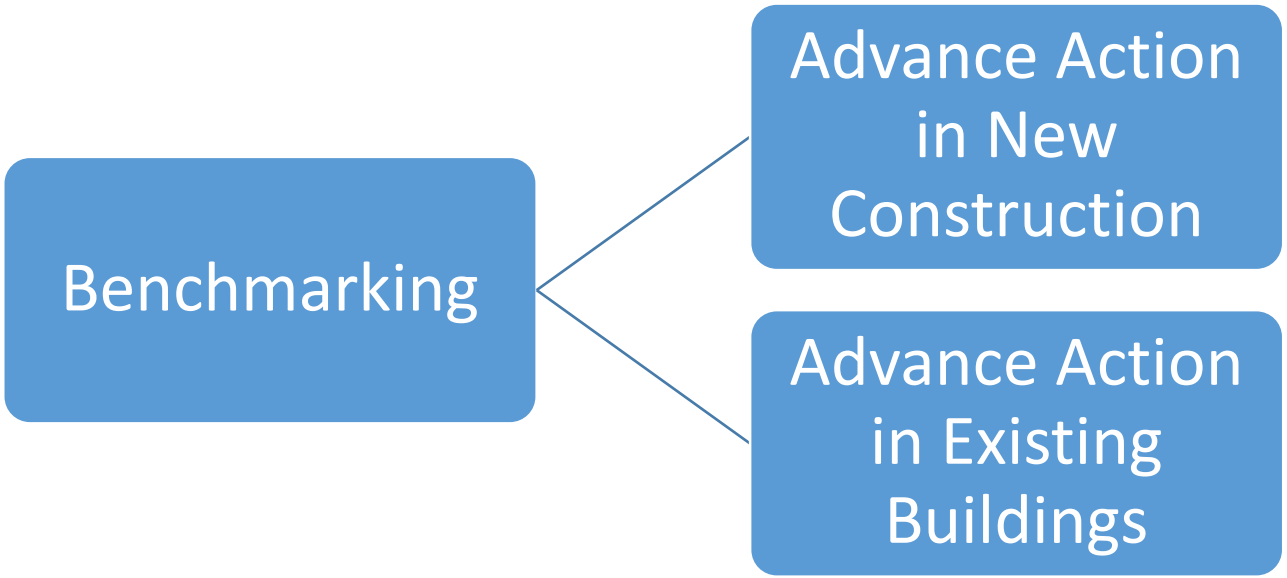
Building Rating
SHARING TRANSPARENCY FOR A MORE EFFICIENT FUTURE

IMT
INSTITUTE FOR MARKET TRANSFORMATION

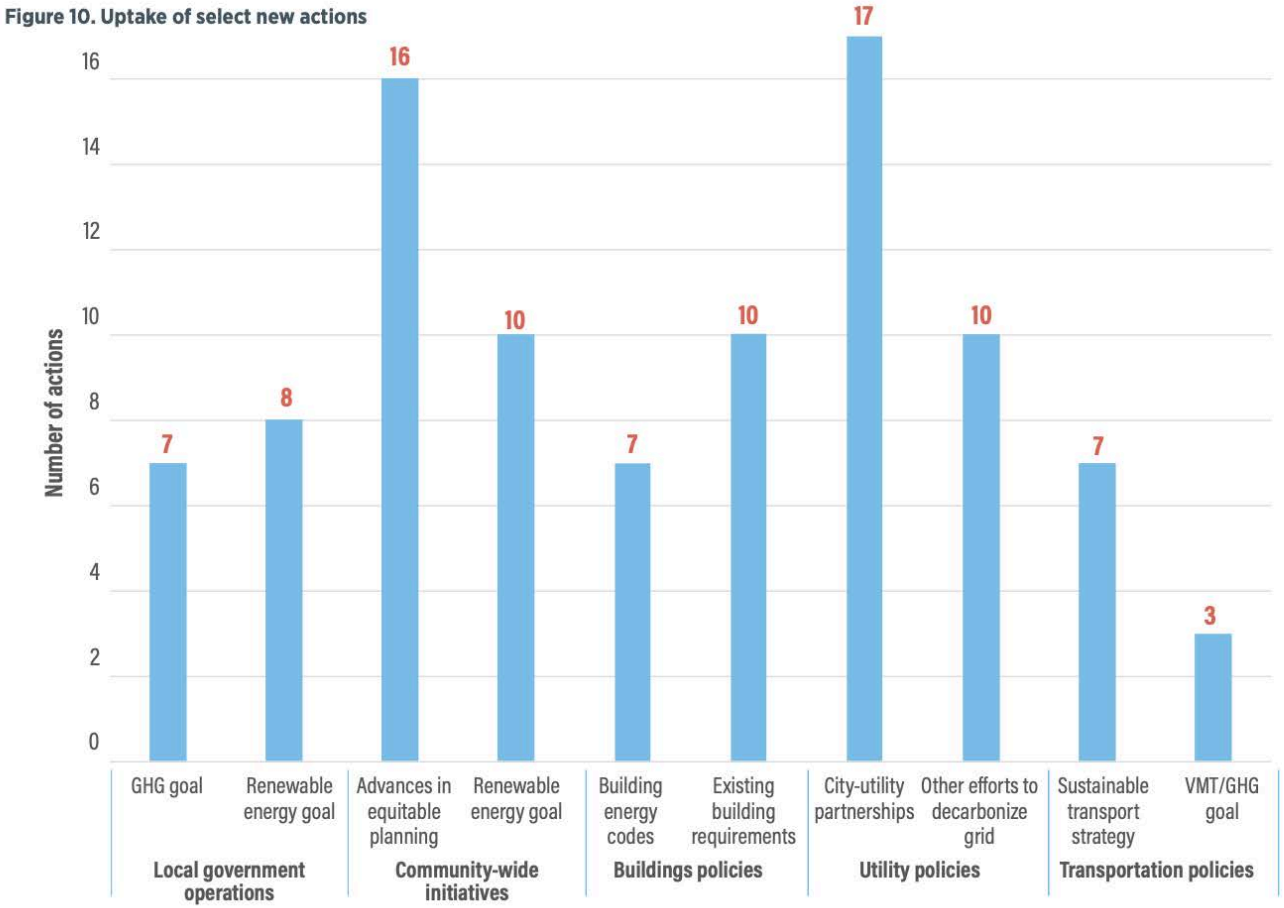
CLIMATE ACTION STATUS

Source: City Energy Scorecard 2020, ACEEE

POLICY ACTION

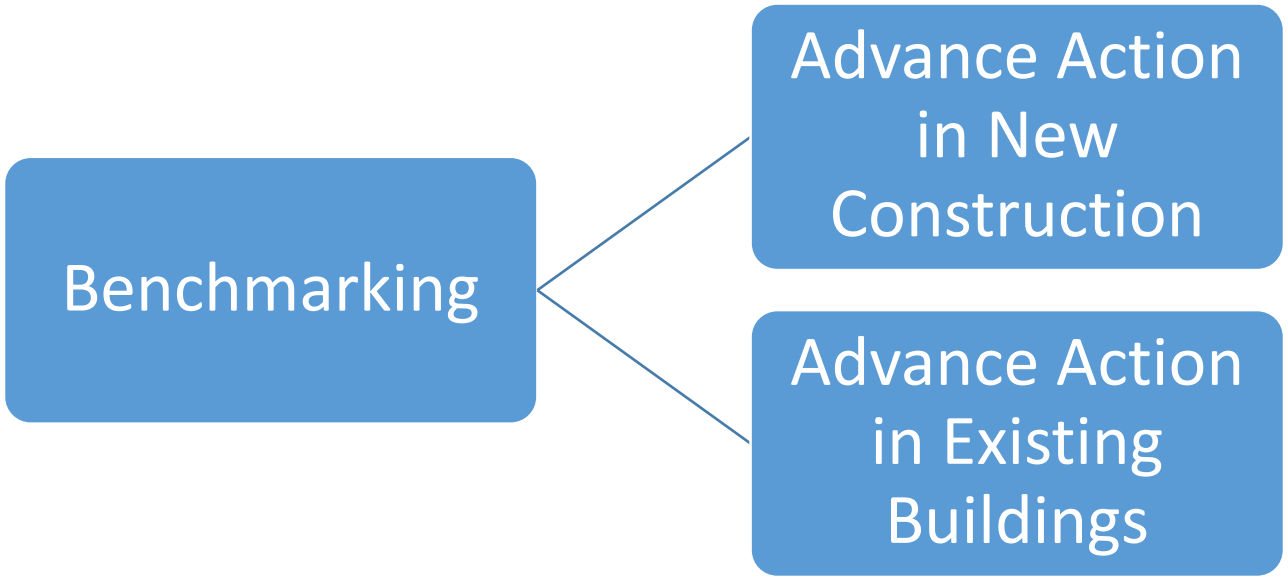


EMERGING TRENDS



Source: 2020 City Energy Scorecard, ACEEE

EXISTING BUILDINGS: ENSURING PERFORMANCE



Seattle

City of Philadelphia

NYC

SUSTAIN ABLE DC

Exploration in 10+ other cities

EXISTING BUILDING ACTIONS

Figure 24. Number of cities in the *City Scorecard* implementing each policy.

Source: 2020 City Energy Scorecard, ACEEE

NEW CONSTRUCTION - CODES

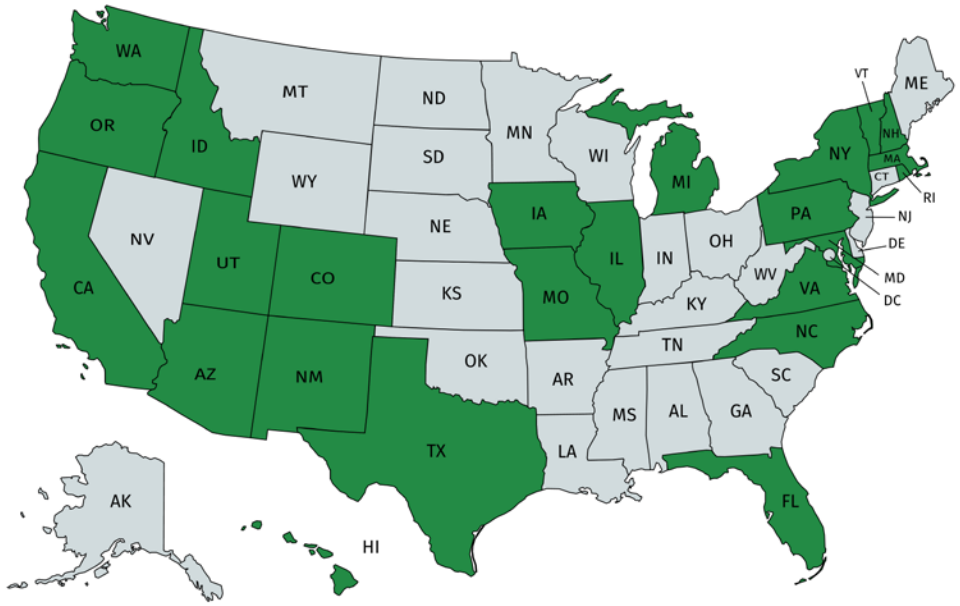
- **Increasing interest in codes as pathway to guarantee emissions reductions**
- **Stretch code support and using codes to define performance targets**
- **Growing interest in voting in codes and future codes changes**

NEW CONSTRUCTION – ELECTRIFICATION

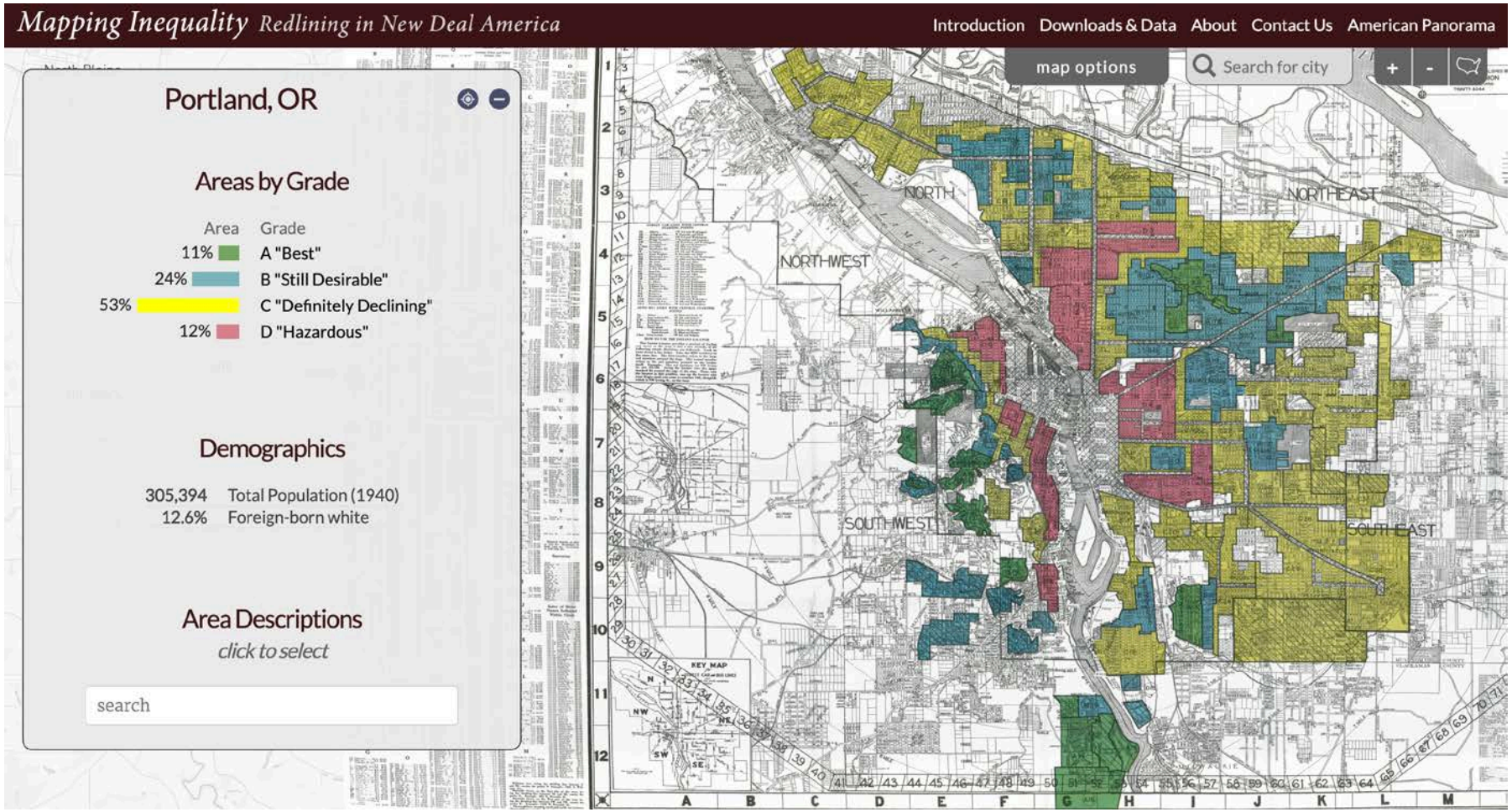
- **Growing interest supporting the electrification of new construction through incentive and policy. Retrofit interest increasing in certain climate zones**

- **Growing number of all-electric zoning provisions and interest natural gas phaseout**

- **Growing interest in local governments participation at regulatory/state-level to support electrification**



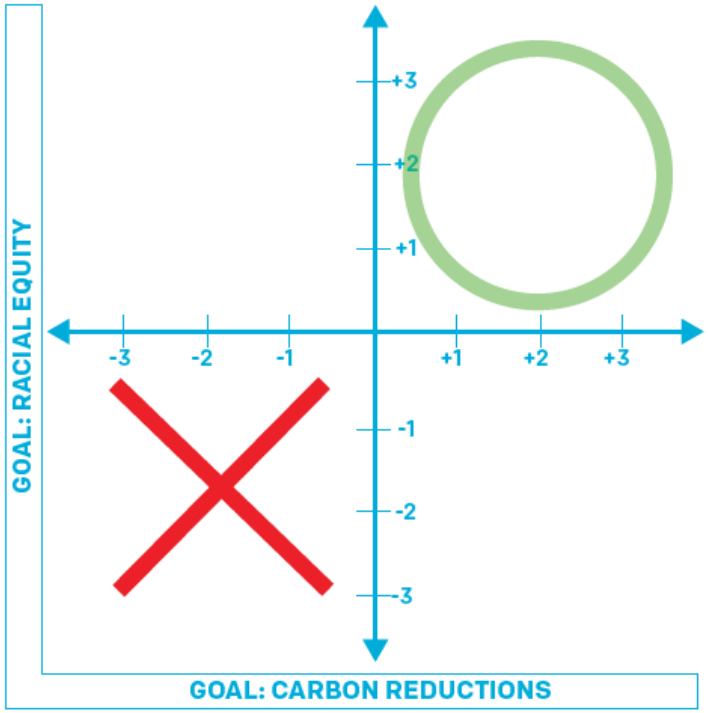
BUILDING POLICY SHIFTS – FOCUS ON EQUITY



For More: https://www.portland.gov/bps/history-racist-planning-portland

EXISTING BUILDINGS: FOCUS ON EQUITY

USDN Equity Assessment Tool



- Community Engagement
- Gentrification and Displacement
- Energy Cost Burden on People of Color
- Economic Prosperity for People of Color
- Substandard Housing and Exposure to Health Risk
- Geographic Location and Environmental Risk

FOR MORE

https://www.usdn.org/

Contact: kathrynwright@usdn.org

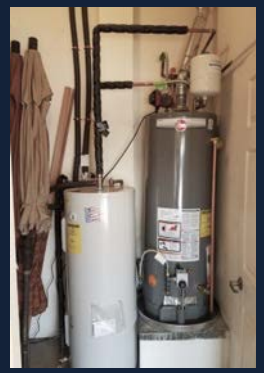
TRANSITIONING TO CLEAN & HEALTHY BUILDINGS

Leah Louis-Prescott | December 10, 2020

Transforming global energy use to create a clean, prosperous, and secure low-carbon future.

POLL QUESTION #4

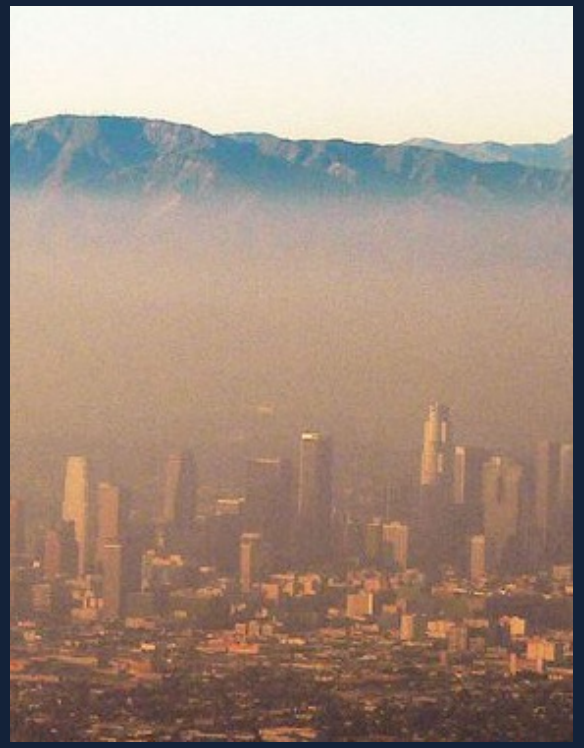
- **Of these 4 appliances, how many are electric in your home – space heater, water heater, cooktop, clothes dryer?**
- 0
- 1
- 2
- 3
- 4
- not sure



FOSSIL FUEL APPLIANCES HARM CLIMATE, AIR, & HEALTH

CLIMATE

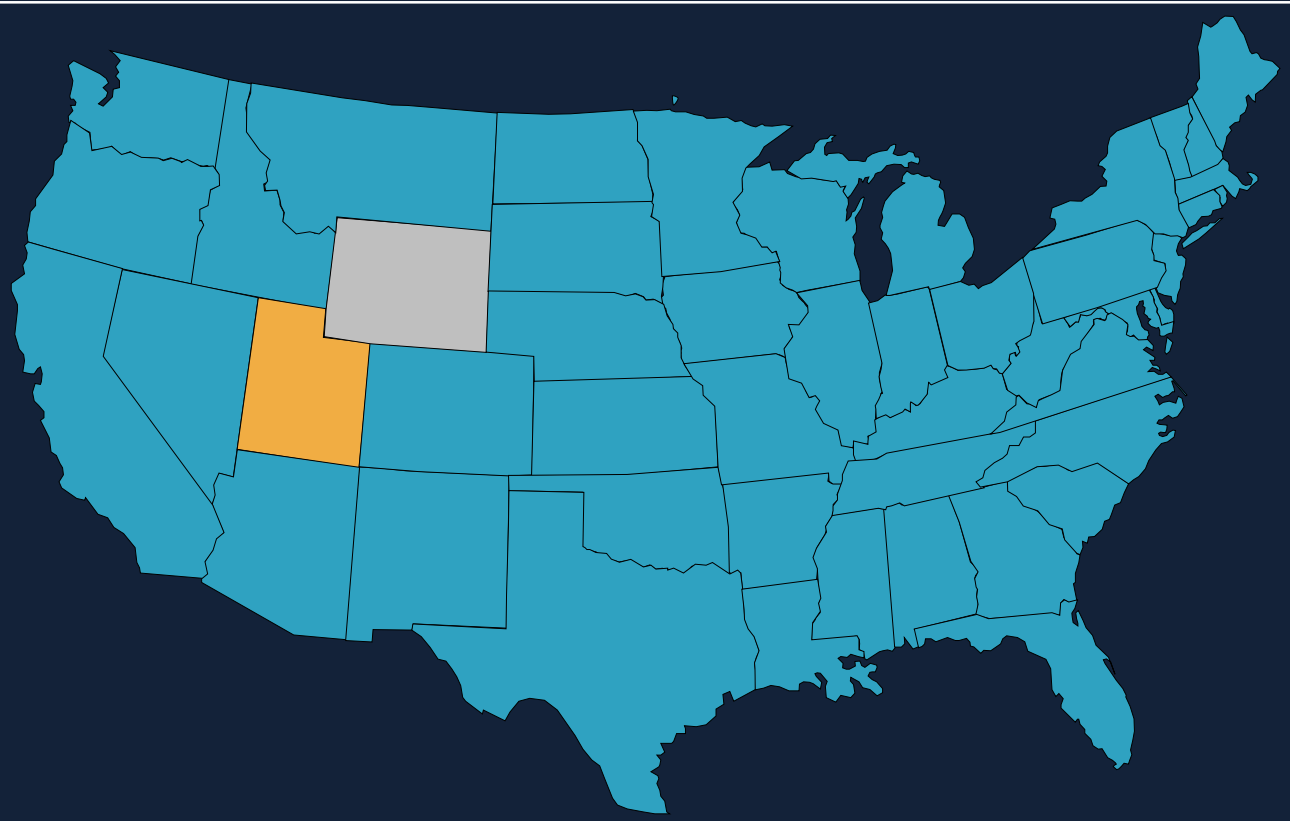
OUTDOOR AIR



INDOOR AIR / HEALTH

HEAT PUMPS REDUCE EMISSIONS IN 99% OF HOMES COMPARED TO GAS FURNACES

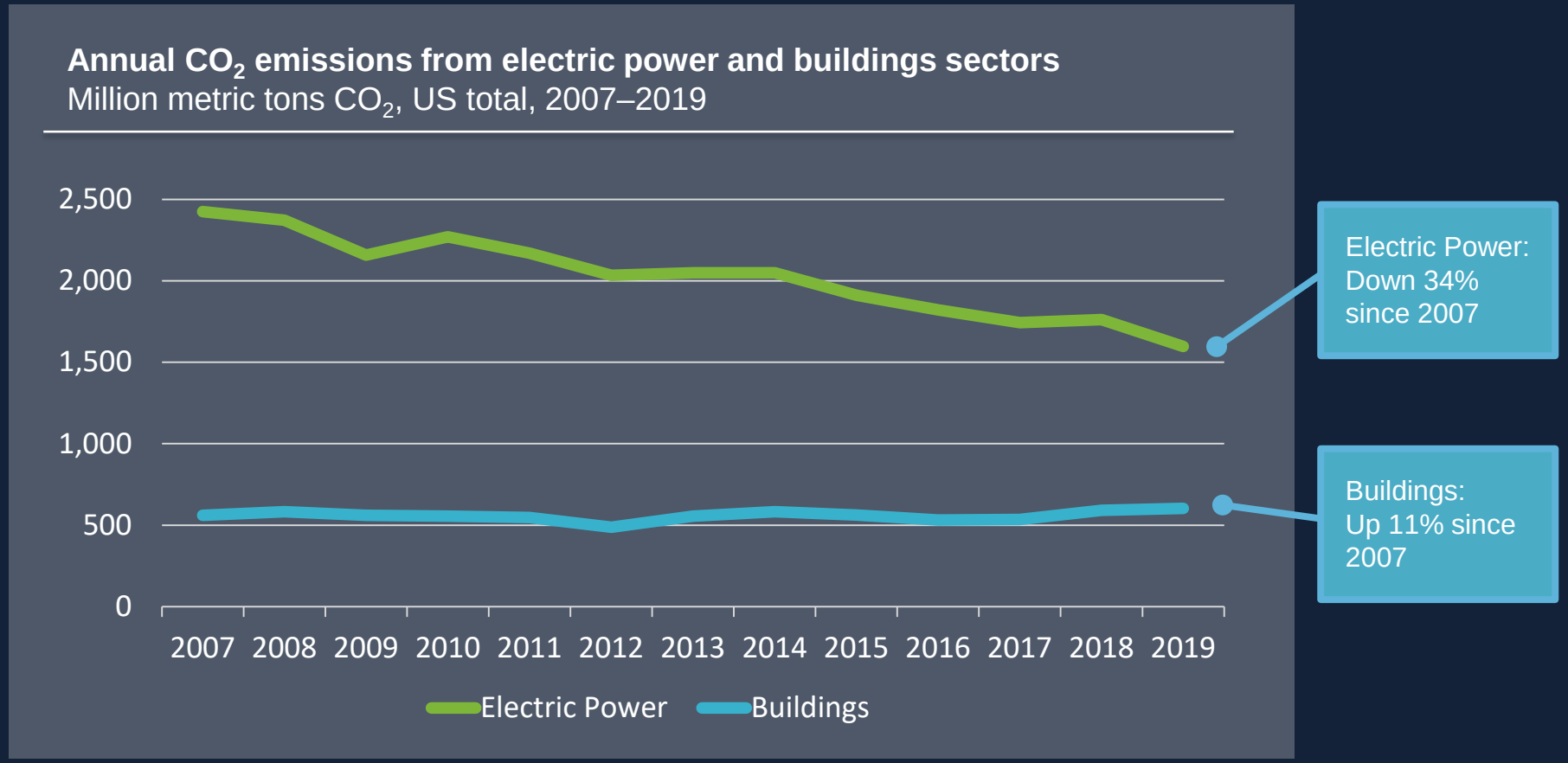
Carbon Emissions Impact by State — Heat Pumps vs. Gas Furnace



- New heat pumps reduce emissions vs. gas
- Pending policy may change outcome
- New heat pump doesn't currently reduce emissions vs. gas

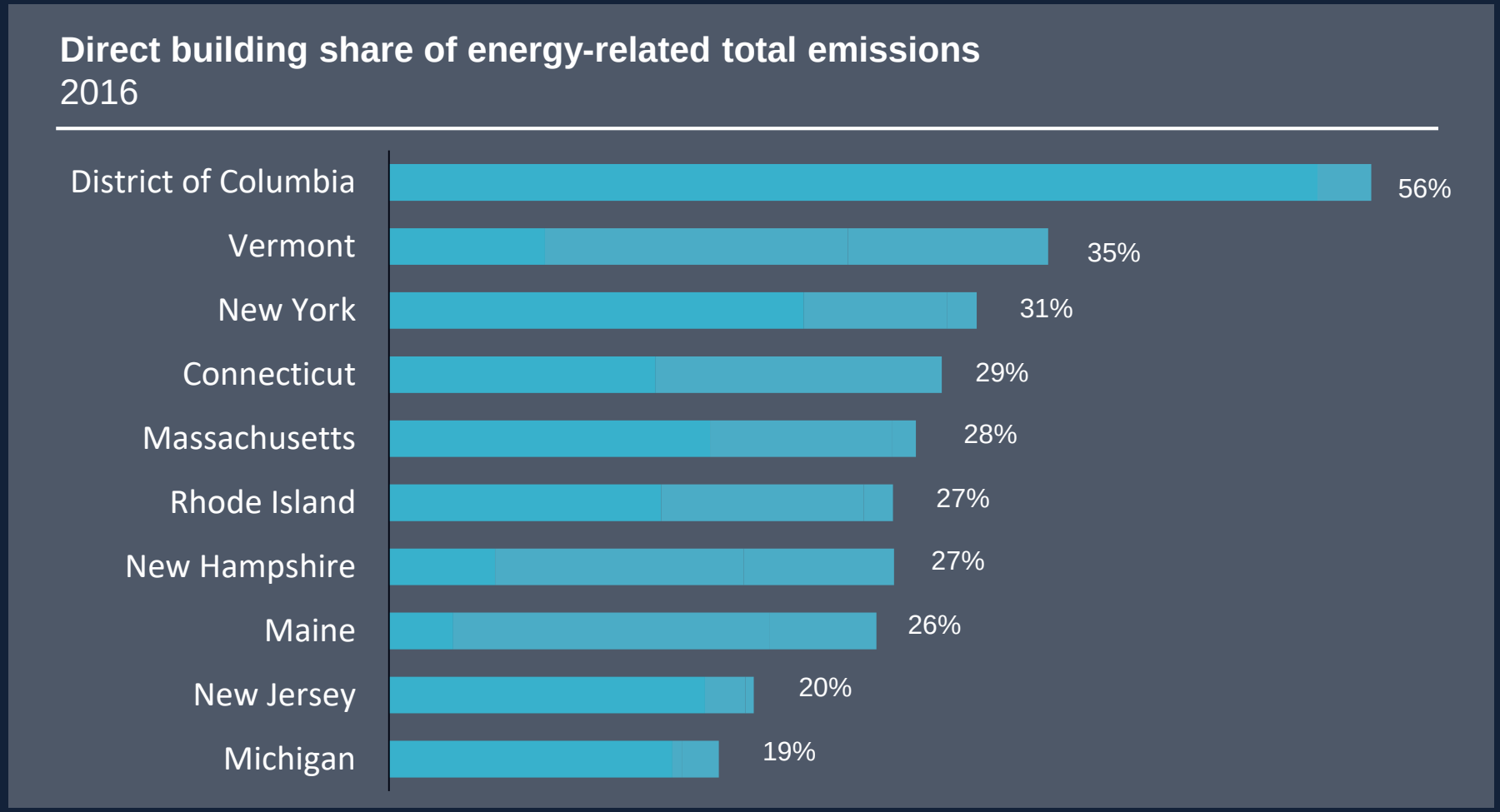
Source: Rocky Mountain Institute, *It's Time To Incentivize Residential Heat Pumps*, 2020

THE U.S. HAS REDUCED ELECTRICITY SECTOR EMISSIONS, BUT NOT BUILDINGS EMISSIONS



Source: EIA 2018; Rhodium Group 2019

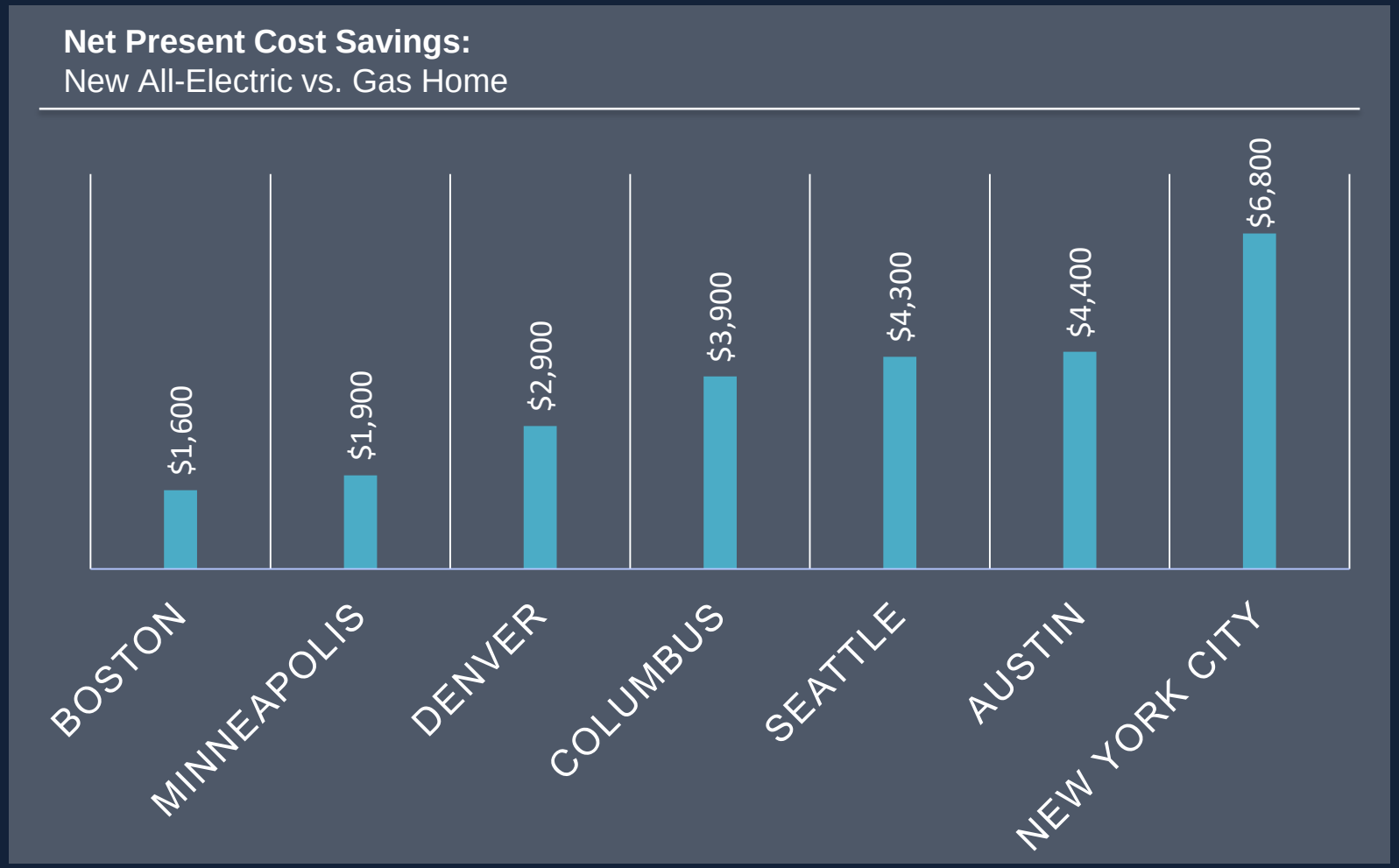
STATES WILL NOT ACHIEVE DECARBONIZATION GOALS WITHOUT CLEAN ELECTRIC APPLIANCES



Note: EIA data accounts for in-state electricity production only, not emissions from imported electricity.

Source: EIA 2016

ALL-ELECTRIC NEW CONSTRUCTION IS CHEAPER THAN BUILDING WITH GAS

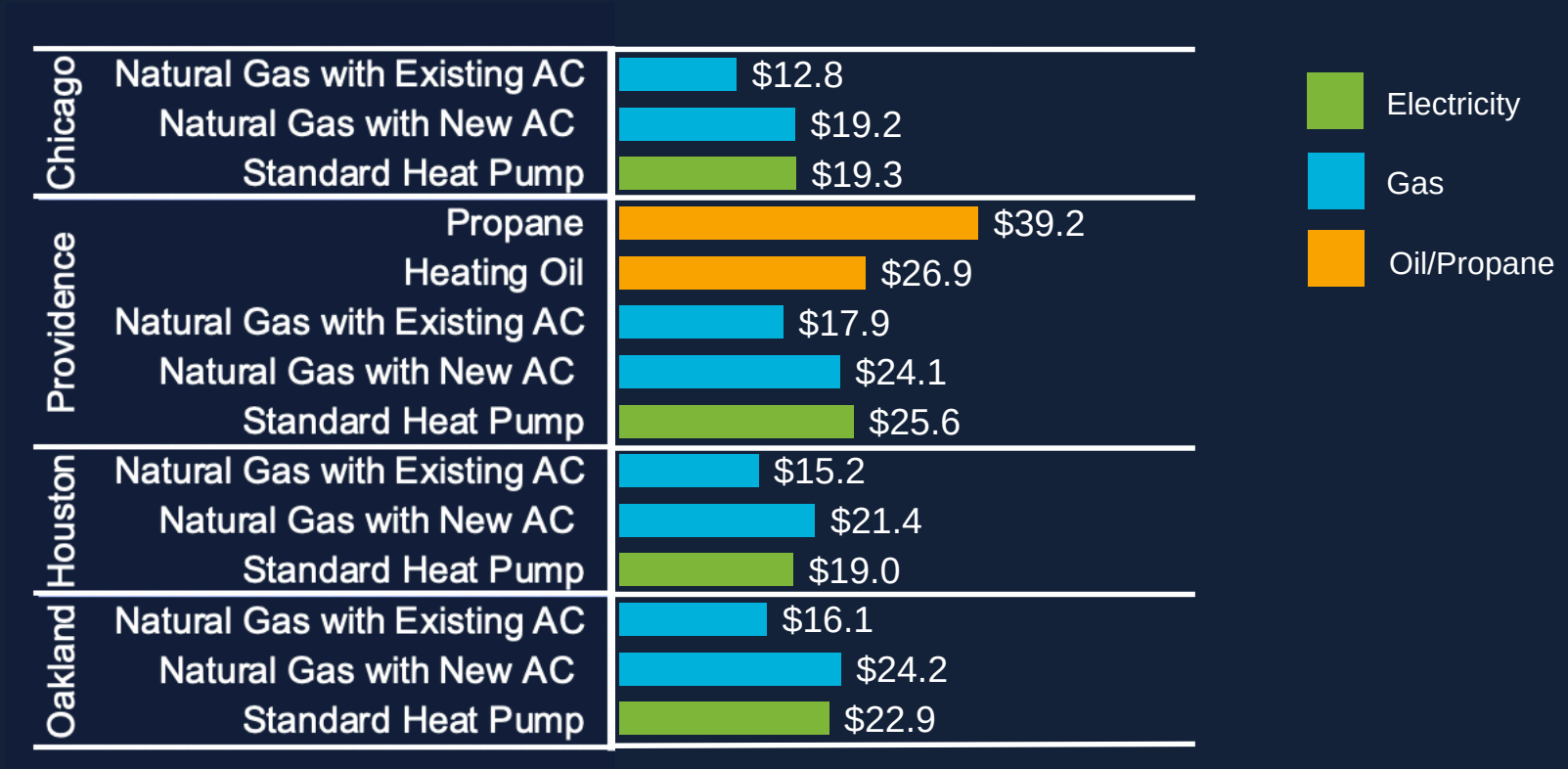


Also true for Chicago, IL; Houston, TX; Oakland, CA: Providence, RI

Source: Rocky Mountain Institute, *The New Economics of Electrifying Buildings*, 2020

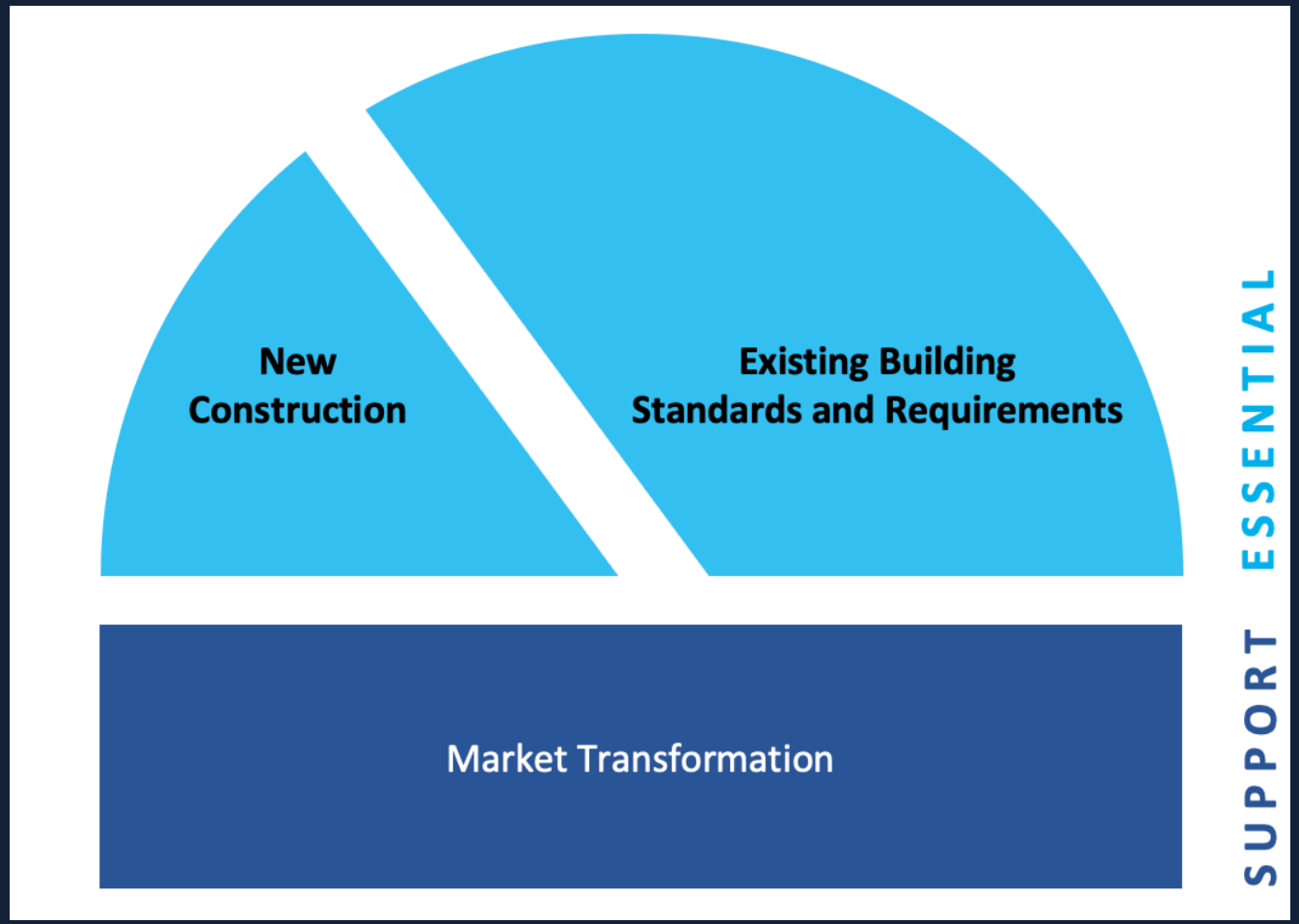
HEAT PUMPS ARE ALREADY COST-EFFECTIVE IN SOME CASES FOR RETROFITS

Net present cost of home heat pump vs. fossil fuel retrofit options



Source: RMI, *The Economics of Electrifying Buildings*, 2018

PATHWAY TO FOSSIL FUEL FREE BUILDINGS



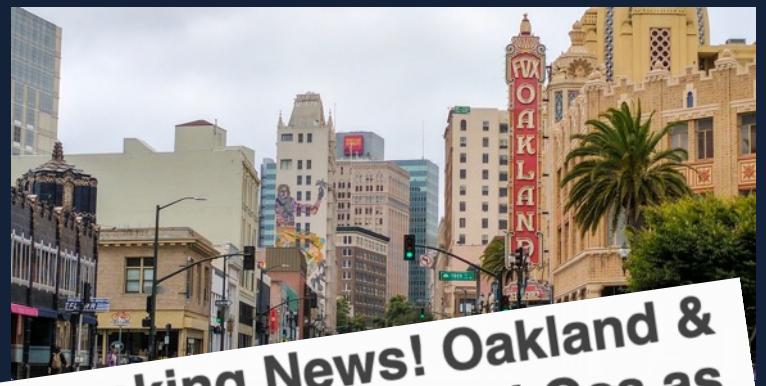
Source: RMI

LOCAL JURISDICTIONS LEAD THE WAY IN NEW CONSTRUCTION

Berkeley Is the First City in America to Ban Gas From New Homes

By David R Baker and Mark Chediak
July 17, 2019, 9:30 AM PDT *Updated on July 17, 2019, 12:14 PM PDT*

Bloomberg



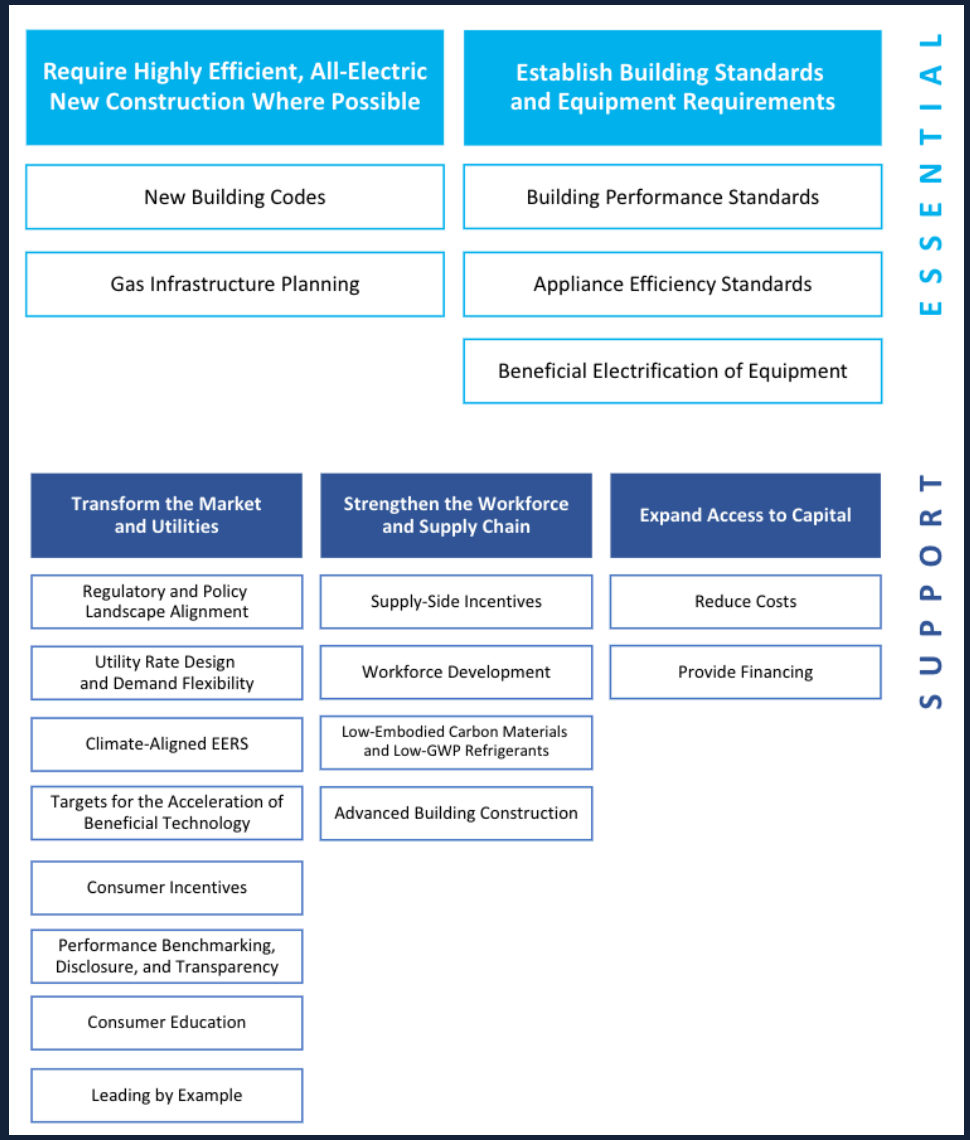
Breaking News! Oakland & Seattle Ban Natural Gas as Cities Continue to Lead on Electrification

December 4th, 2020 by Joe Wachunas

CleanTechnica

Source: Bloomberg 2019; CleanTechnica 2020

WHAT CAN STATES AND CITIES DO?



Source: RMI

THANK YOU

LLOUISPRESCOTT@RMI.ORG

Discussion

Please type any questions into the Zoom chat.

Thank You!

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www.energycodes.gov/training

BECP help desk
https://www.energycodes.gov/HelpDesk

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