



Building Resilience: A Community Perspective on Energy Codes

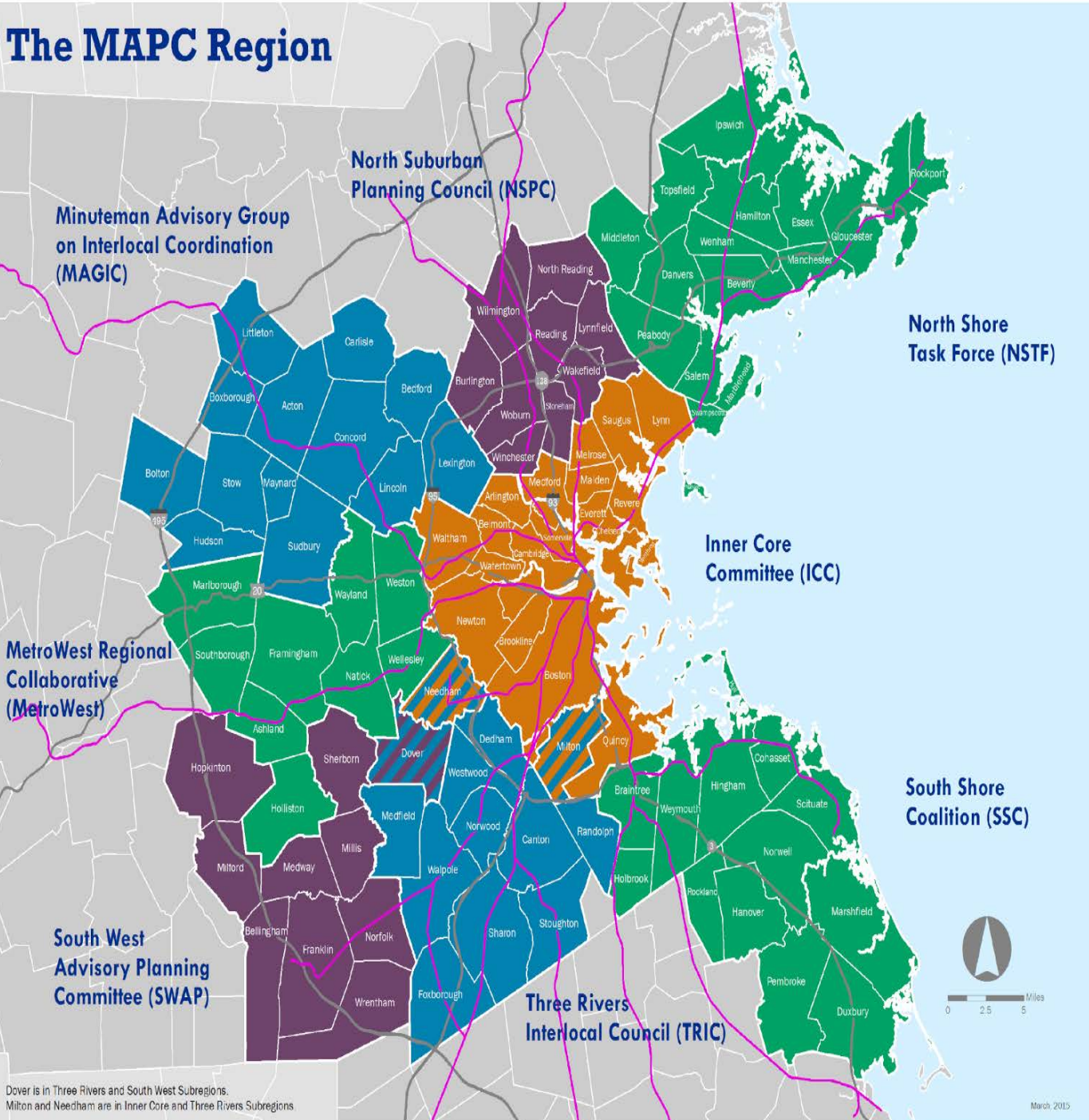
Presentation by the Metropolitan Area Planning Council
(MAPC)

at the U.S. Department of Energy
2019 National Energy Codes Conference

May 30, 2019



The MAPC Region



Minuteman Advisory Group on Interlocal Coordination (MAGIC)

North Suburban Planning Council (NSPC)

North Shore Task Force (NSTF)

Inner Core Committee (ICC)

MetroWest Regional Collaborative (MetroWest)

South Shore Coalition (SSC)

South West Advisory Planning Committee (SWAP)

Three Rivers Interlocal Council (TRIC)

101 municipalities

1,440 square miles

Nearly 3.2 million residents

1.8 million jobs (2010 Census)

Dover is in Three Rivers and South West Subregions.
Milton and Needham are in Inner Core and Three Rivers Subregions

Clean Energy & Resiliency



1) Regional Clean Energy Projects

- Green Municipal Aggregation
- Green Mobility Program
- Municipal and Community Solar
- ESCO Procurement
- LED Streetlight Retrofit Program
- Energy Resiliency
- Solar Hot Water



2) Clean Energy Planning

- Community energy data, baselining, planning, and strategizing
- Connecting municipalities with incentives + plug-and-play programs
- Net Zero planning, guidance, and education
- Storage, microgrids, and district energy



3) Clean Energy Technical Assistance

- Peak Demand Management
- Green Communities
- Methane Leaks
- Data Analysis
- Permitting and Zoning
- State and Local Policy
- Building Codes
- Grant Writing



Urgency of Now

2018 was 4th hottest year on record for the globe

The U.S. experienced 14 billion-dollar weather and climate disasters

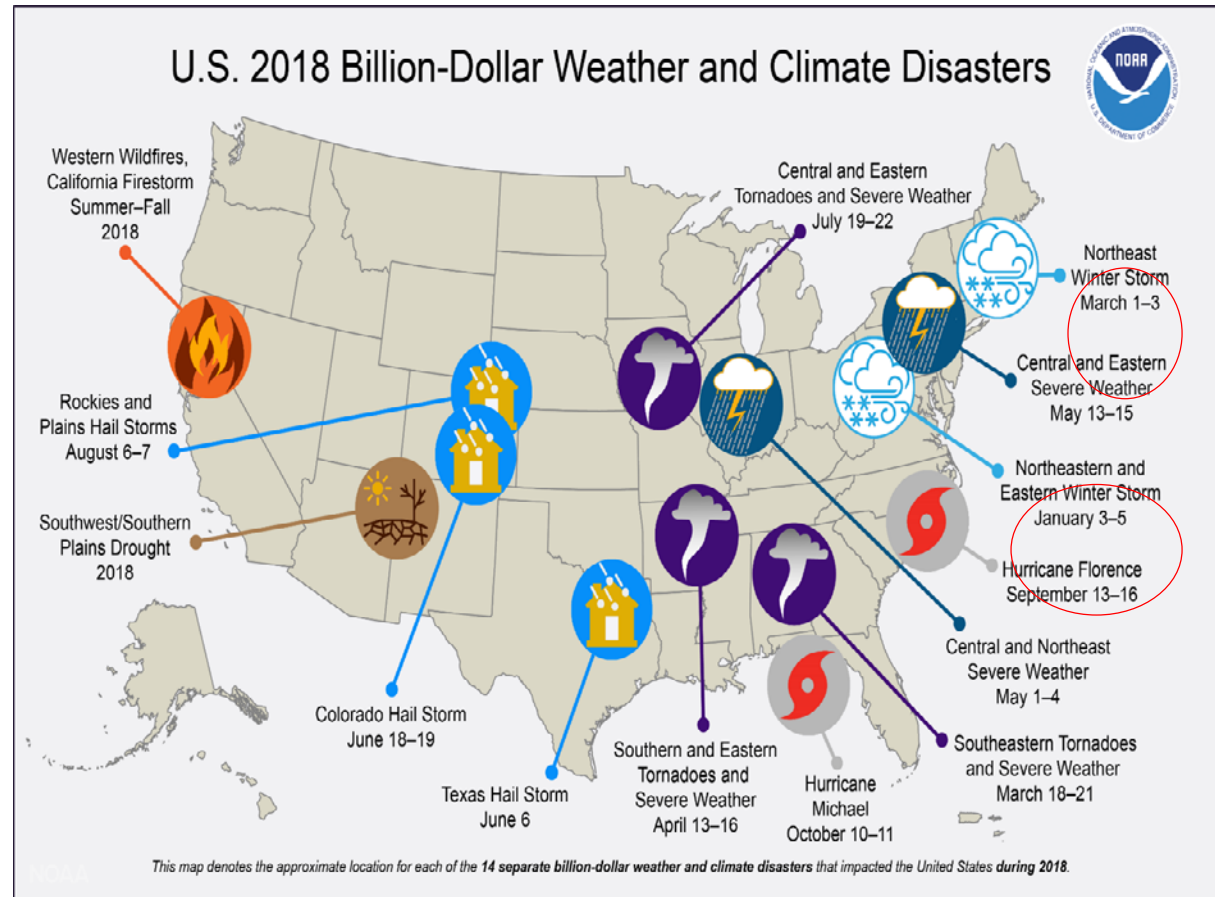
Climate Satellites | climate analyses and statistics global average temperatures



February 6, 2019 —



National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Urgency of Now

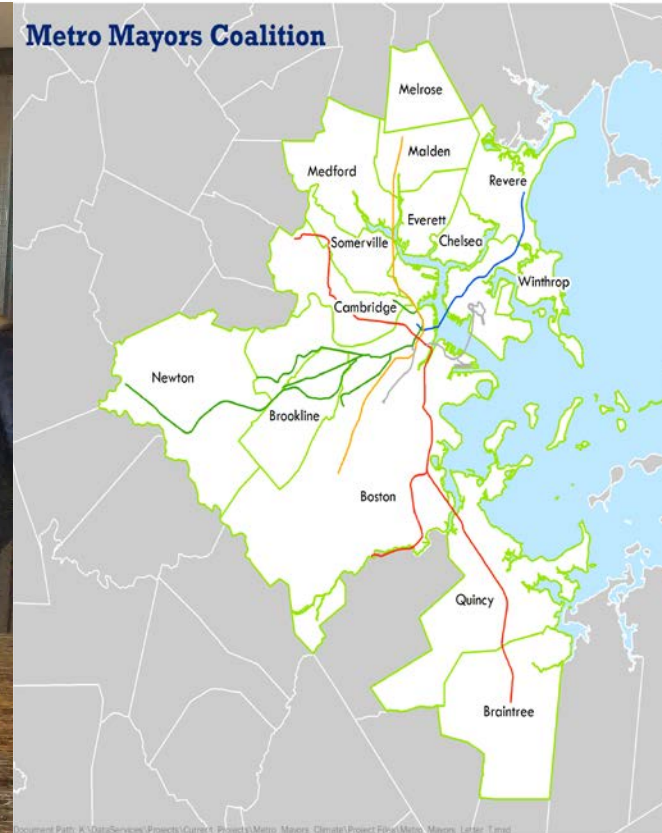


Collins Cove, Salem during Winter Storm Grayson, January 2018
Photo by Matt Almeida. Source: [Patch](#)



Woodman's of Essex during Winter Storm Riley, March 2018.
Source: [Woodman's of Essex](#)

Metro Mayors Coalition Climate Preparedness Taskforce



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Holistic Planning

Multi-Benefit Outcomes

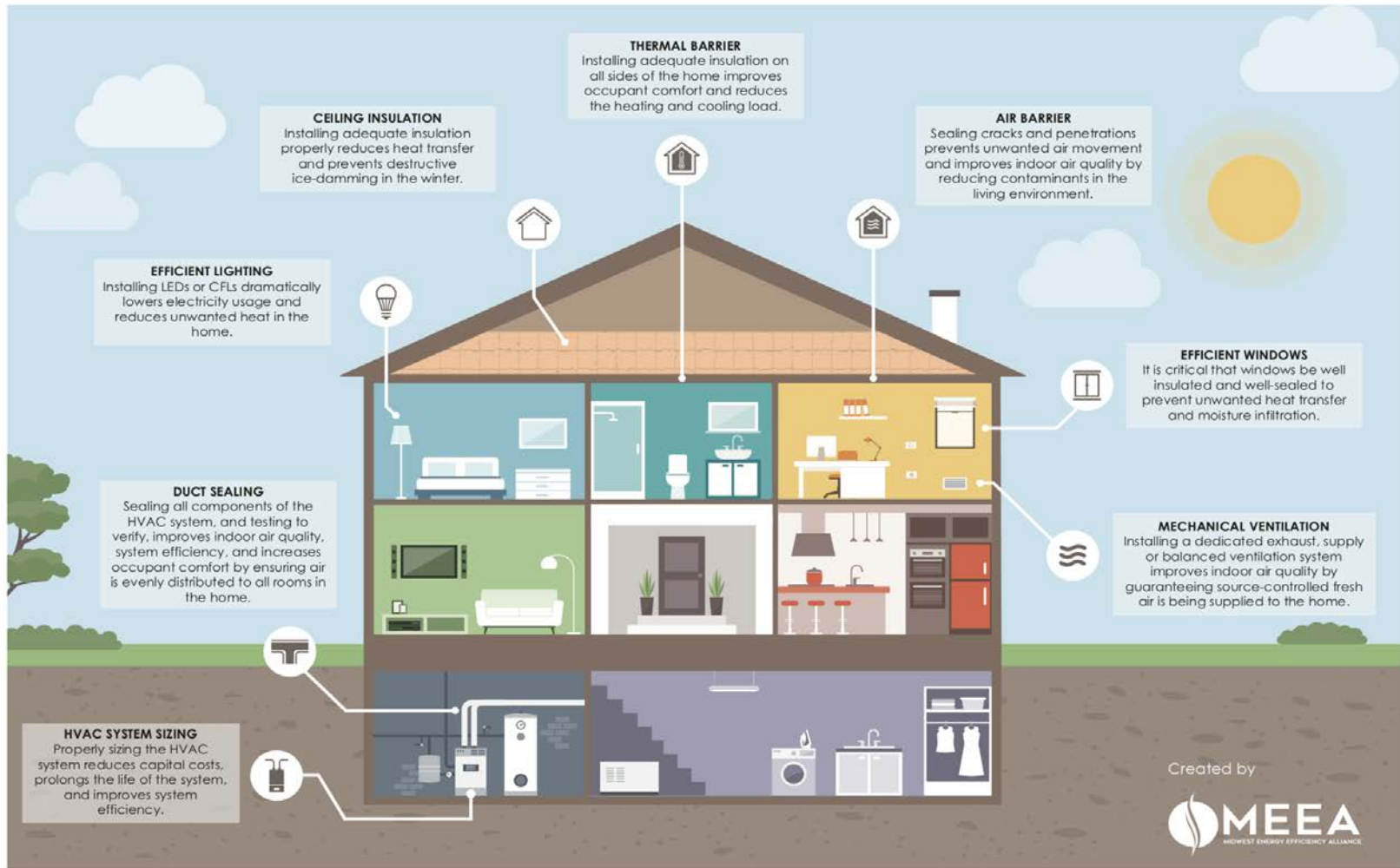
- **Energy**
- **Resiliency**
- **Economic**
- **Environmental**
- **Public Health**
- **Equity**
- **Livability**



Bringing Net Zero to 101 Cities and Towns and Beyond

Multi-Benefit Buildings

How the Energy Code Improves a Home



How Can We Improve Buildings?

Higher Performing Buildings

International
Energy
Conservation
Code (IECC)

Base Building
Energy Code

Stretch
Energy Code

Local
Ordinances

Taking Action



There are four main ways that Massachusetts municipalities can impact building regulations:

VOTE

COMMENT

ADOPT

ENFORCE

International
Energy
Conservation Code
(IECC)

Base Code
(MA Building Code
CMR 780)

Stretch Energy
Code
(780 CMR Ch. 15
AA)

Zoning and other
local ordinances

Stretch Energy
Code
(780 CMR Ch. 15
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Zoning and other
local ordinances

Base Code
(MA Building Code
CMR 780)

Stretch Energy
Code
(780 CMR Ch. 15
AA)

Local Ordinances



MARCH 26, 2018

MOVER: Ellen Tohn

MOTION – 2018 ATM

ARTICLE 22: RESOLUTION: ENERGY AND CARBON SAVINGS IN MUNICIPAL BUILDING CONSTRUCTION

I MOVE YOU SIR:

MOVED:

Whereas Wayland was recognized as a Massachusetts Green Community in 2011 and has a commitment to reduce municipal carbon-based energy use and encourage reduction of residential and commercial carbon-based fuel use.

Whereas, Wayland recognizes that global warming is a threat to our world, impacting the ability of current and future generations to lead healthy, productive and enriching lives.

Whereas, buildings can be designed to reduce their energy and carbon use, lower their lifetime energy operating costs, and improve their energy resiliency by incorporating cost effective energy efficient design, building system controls, and on-site renewable energy generation and energy storage.

Whereas, our municipal buildings are a significant contributor to municipal carbon-based energy costs. New construction and substantial renovation of municipal buildings are significant expenditures and create structures that will endure for decades.

Therefore, be it resolved that Wayland shall seek cost-effective design and construction of all new municipal building construction and substantial renovation projects to minimize carbon-based energy use through cost-effective energy efficient design, building system controls, and on-site renewable energy generation and energy storage.



Wayland
MASSACHUSETTS

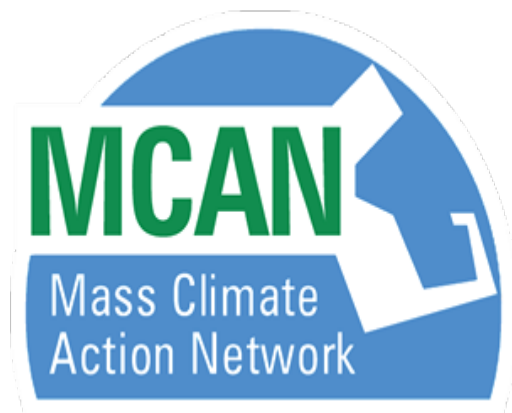
MA State Building Code

Mass General Law (MGL), Chapter 143, Section 94

“To adopt and fully integrate the latest International Energy Conservation Code as part of the state building code, together with any more stringent energy-efficiency provisions that the board, in consultation with the Department of Energy Resources, concludes are warranted.”



Nationwide Code



Energy Efficient Codes Coalition



IECC for Cities and Towns



US Conference of Mayors
86th Annual Conference of Mayors
June 8-11, 2018 Boston, MA
Resolution: **Uniting Cities to Accelerate Focus on
the Economic and Climate Benefits of Boosting
America's Building Energy Efficiency**

BE IT FURTHER RESOLVED, The U.S. Conference of Mayors urges mayors from around the nation to work in conjunction with NGOs and other broad-based organizations promoting greater building efficiency to unite and maximize local government support for putting America's Model Building Energy Code, the IECC, on a glide path of steady progress toward net zero building construction by 2050.



Energy Efficient Codes Coalition



THE UNITED STATES CONFERENCE OF MAYORS



IECC for Cities and Towns



**Who Develops
America's Building
Energy Code (the
IECC)?**

**Local and State Officials
from Across America!**

**Who Enacts Building
Energy Codes?**

**State & Local
Governments**

**Who Enforces
Building Energy
Codes?**

**Mostly Local
Governments**

MA State Building Code



Massachusetts State Hazard Mitigation and Climate Adaptation Plan



September 2018

Board of Building Regulation and Standards (BBRS)



Adding Resiliency to the Code



The Massachusetts State Building Code

Areas of Opportunity

Several areas of opportunity were identified during the three stakeholder convenings for both adaptation and mitigation. Many of these suggestions are captured in the pathways section above. The following opportunities generated some consensus among different stakeholder groups:

Flood-resistant construction

The need to address sea level rise and other flood-related climate impacts in codes was noted by a number of participants. Recommendations included:

- Establishing a design flood elevation in the code with varying freeboard requirements based on local geographic risk;
- Using updated maps with forward-looking data rather than relying on FEMA FIRMs; and
- Establishing a consistent practice for elevating critical equipment above future flood levels and addressing the use of temporary flood barriers.

Municipal officials had mixed views on the accuracy of existing FEMA FIRMs for current conditions and there was a recognition that some cities and towns may have more accurate FEMA maps than others. However, there was general agreement that FEMA maps are not ideal long-term planning tools because they do not account for future conditions like sea level rise.

Participants also noted that the code currently does consider the design life of a structure, but this factor could be used to vary freeboard requirements in addition to geographic risk.

Building performance

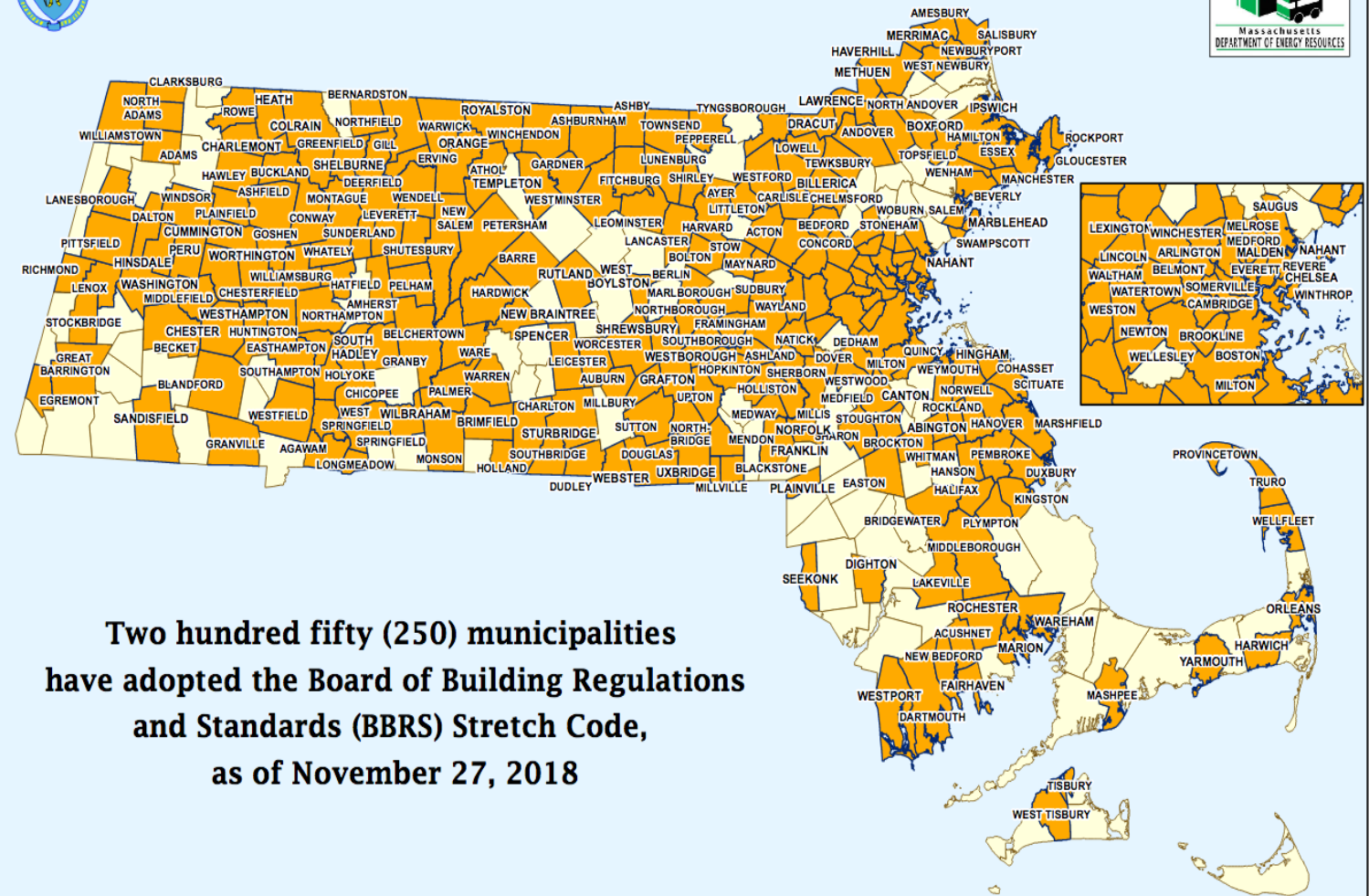
In each of the three convenings, participants discussed the need to address building performance. Disclosure requirements and recommissioning were widely supported. There was general consensus that in many cases, buildings are not being operated as intended, which decreases their effectiveness and could also present air quality health risks. There was some debate about how best to approach this issue and concern about the feasibility of code compliance and enforcement if commissioning requirements were more stringent. One recommendation was to revise the code to require that commercial projects be recommissioned at least every five years. Participants noted that this would interface with building disclosure ordinances passed at the local level.

There was also a recommendation for Massachusetts to require owners to submit a maintenance plan and schedule to complement the recommissioning process. However, this

MA Stretch Energy Code



Stretch Code Adoption, by Community



Improving the Stretch Code



What a Tiered Stretch Code Could Look Like:

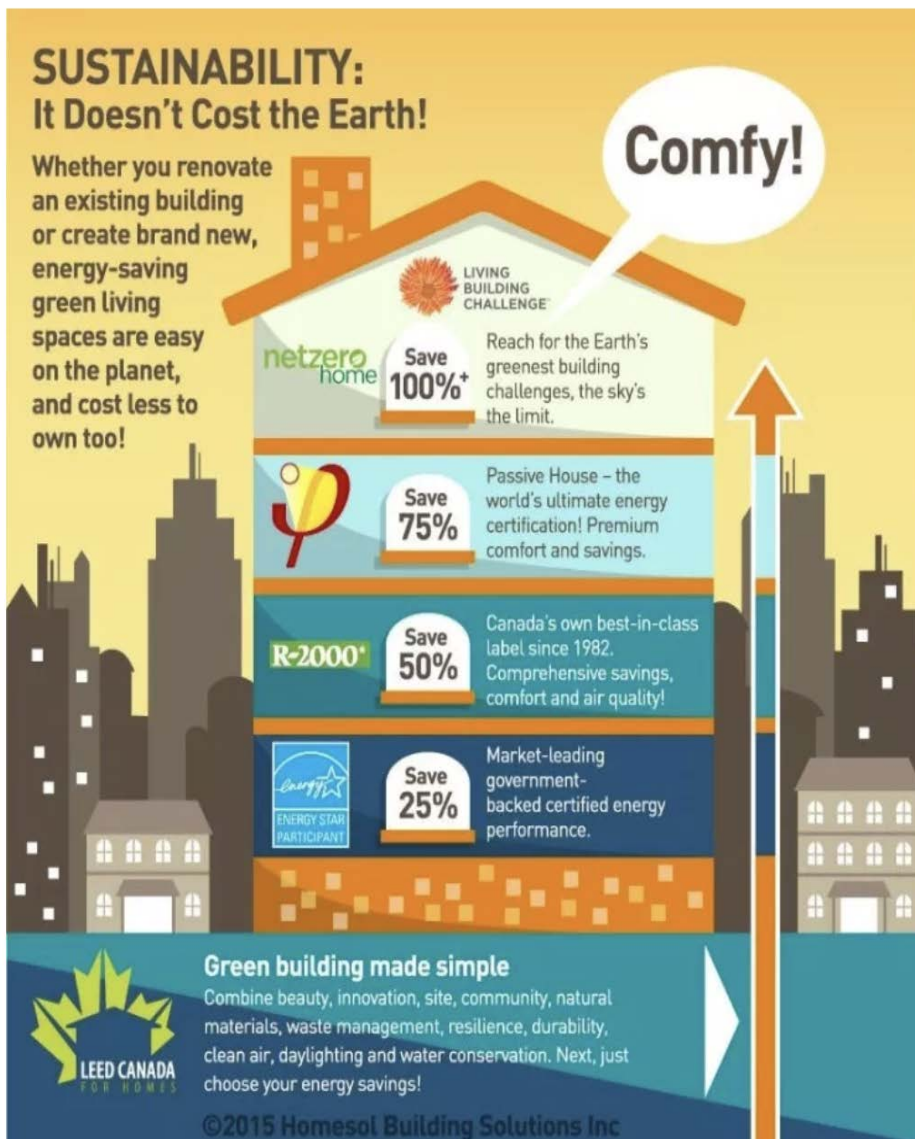
1. Updated stretch code based on current I-Codes. (The current stretch code is based on the 2016 ICC and 2013 ASHRAE.)
2. A pathway based on Passive House and other standards that municipalities could adopt to go beyond the requirements of the stretch code and achieve higher efficiency (i.e. 15% more efficient as opposed to 10%).
3. A Net Zero Stretch Code option adopting Appendix G or a pathway from another state.

Co-Benefits for All

SUSTAINABILITY: It Doesn't Cost the Earth!

Whether you renovate an existing building or create brand new, energy-saving green living spaces are easy on the planet, and cost less to own too!

Comfy!



LIVING BUILDING CHALLENGE
Reach for the Earth's greenest building challenges, the sky's the limit.
Save 100%+

netzero home

Passive House – the world's ultimate energy certification! Premium comfort and savings.
Save 75%

R-2000+ Canada's own best-in-class label since 1982. Comprehensive savings, comfort and air quality!
Save 50%

ENERGY STAR PARTICIPANT Market-leading government-backed certified energy performance.
Save 25%

Green building made simple
Combine beauty, innovation, site, community, natural materials, waste management, resilience, durability, clean air, daylighting and water conservation. Next, just choose your energy savings!

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Energy-efficient buildings

Allows residents/tenants to shelter in place longer, reduces annual energy spending, and reduces overall net emissions. Can help vulnerable populations avoid dangerous and occasionally life-threatening situations in which weather and economics present a dual threat

District energy systems

Underground system pipes steam, hot water, or chilled water to buildings from nearby energy source and reduces peak power demand through thermal energy storage

Microgrids

May disconnect from grid during power outage, maintaining power supply; allows facilities receiving backup power to double as shelter for displaced residents; reduces overall net emissions, and potentially increases cost savings

Combined heat & power

Provides backup power, allows facilities receiving backup power to double as shelter for displaced residents, reduces overall net emissions, and potentially increases cost savings

Transit-oriented development

Increases economic development opportunities; provides transportation cost savings and reduces impacts of price volatility; and may improve air quality

Cool roofs & surfaces

Reflective and lighter-colored surfaces reduce urban heat islands effect, electricity demand, and overall net emissions

Green infrastructure

Reduces localized flooding due to storms, energy demand, and urban heat island effect in cities

Utility energy efficiency programs

Increases reliability, and reduces utility costs

Transportation alternatives

Multiple transportation modes can be used during evacuations and everyday disruptions



Thank you!



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