

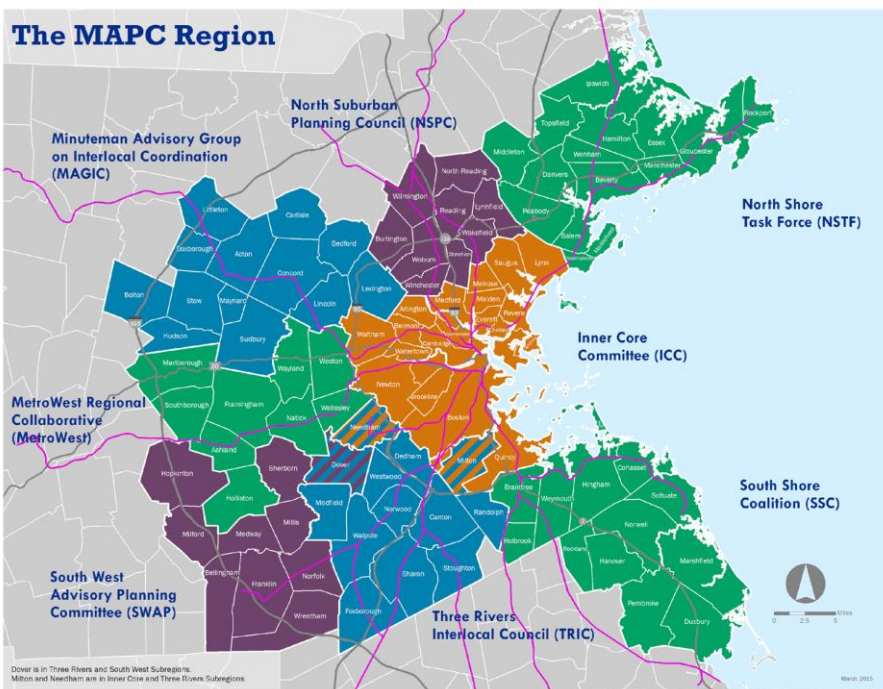


# Zero to 101: Accelerating the Pathway to Zero for the 101 Cities and Towns of Metro Boston

GETTING TO  
**zero**  
FORUM

**Cammy Peterson, Director of Clean Energy**  
**Metropolitan Area Planning Council (MAPC)**

**October 10, 2019**



**101 municipalities**

**1,440 square miles**

**Nearly 3.2 million residents**

**1.8 million jobs  
(2010 Census)**

# MAPC: Clean Energy



## Regional Clean Energy Projects

- LED Streetlight Retrofit Program
- Green Municipal Aggregation
- ESCO Procurement
- Green Mobility Program
- Regional Solar Initiative
- Energy Resiliency



## Climate and Clean Energy Planning

- Clean energy and climate baselining, planning, and strategizing
- Connecting municipalities with incentives + plug-and-play programs
- Outreach programming and education



## Clean Energy Technical Assistance

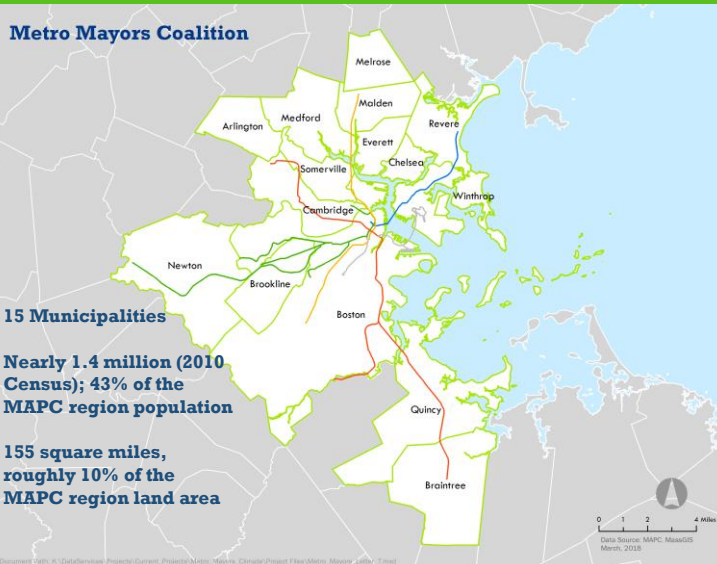
- Grant Writing
- Solar Permitting and Zoning
- Green Communities Support
- State and Local Policy
- Methane Leaks
- Net Zero Guidance & Education



# MAPC: Metro Mayors Coalition Climate Taskforce



## Metro Mayors Coalition



**Climate Preparedness Commitment**  
Spring 2015

**Climate Mitigation Commitment**  
Fall 2016

### Strategic Priorities:

- Enhance Local Alignment and Capacity Building
- Mitigate Heat Impacts
- Mitigate Flooding Impacts
- Deepen Regional, State and Federal Coordination on Infrastructure Activities
- **Net Zero/Carbon Free Region by 2050**

# Metro Mayors: Net Zero by 2050



## Buildings

**Action 1** Amend the municipal zoning code to require that all large-scale building projects meet a minimum Certified Green Building Standard (e.g. LEED Silver or Gold, Living Building Challenge, or comparable).

**Action 2** Establish a streamlined and fast-tracked permitting process as well as reduced or eliminated fees for new construction and major renovations that include renewable energy or energy efficiency features.

**Action 3** Adopt a Building Energy Reporting and Disclosure Ordinance (e.g. Boston's BERDO or Cambridge's BEUDO) for Large Buildings and Institutions.

**Action 4** Adopt the Stretch Energy Code.

Source: <http://www.mapc.org/wp-content/uploads/2017/09/FINAL-Metropolitan-Mayors-Climate-Mitigation-Commitment.pdf>

# Zero to 101 Initiative



- 2017 MAPC Clean Energy Forum: Planning for Net Zero
- Net Zero Planning Resources Web Platform
- GHG Inventories
- Community Net Zero Planning
- Municipal Net Zero Playbook
- MetroCommon x 2050



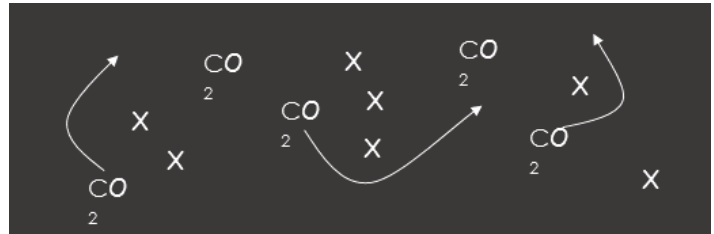
# Net Zero Framework: Holistic Climate Planning



## *Municipal Playbook*

### Multi-Benefit Strategies

- Energy
- Economic
- Environmental
- Public Health
- Equity
- Quality of Life



Approximately 400,000  
buildings in Metro Boston

# Taking Action



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

## VOTE

International  
Energy  
Conservation Code  
(IECC)

## COMMENT

Base Code  
(MA Building Code  
CMR 780)

Stretch Energy  
Code  
(780 CMR Ch. 15  
AA)

## ADOPT

Zoning and other  
local ordinances

Stretch Energy  
Code  
(780 CMR Ch. 15  
AA)

## ENFORCE

Zoning and other  
local ordinances

Base Code  
(MA Building Code  
CMR 780)

Stretch Energy  
Code  
(780 CMR Ch. 15  
AA)

# MA State Building Energy 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.”



# Local Levers



**Wayland**  
MASSACHUSETTS

MARCH 26, 2018

ADOPTED: Ellen Tobin

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.

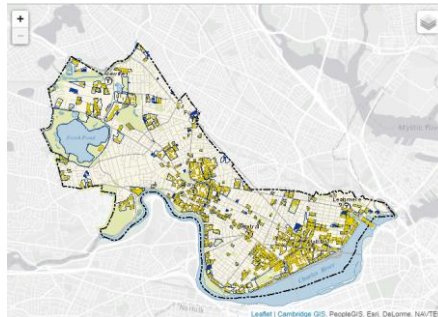
Whereas, Wayland recognizes that global warming is a threat to our world, impacting the ability of current and future generations to lead healthy, productive and enriching lives.

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.

[www.wayland.ma.us/sites/waylandma/files/uploads/2018\\_atm\\_warrant\\_to\\_post.pdf](http://www.wayland.ma.us/sites/waylandma/files/uploads/2018_atm_warrant_to_post.pdf)



**Building Energy Use Disclosure Compliance Map**



**CITY OF BOSTON**  
BUILDING ENERGY REPORTING AND DISCLOSURE ORDINANCE

## Art. 29: Zero Energy Town Buildings

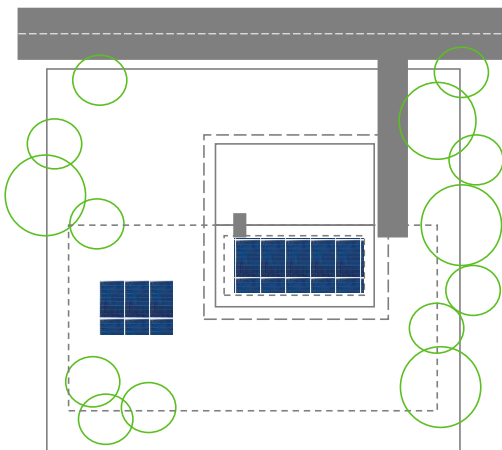
Amherst Select Board & Mothers Out Front

April 11, 2018

The work was done in a spirit of collaboration with a goal of preserving the original purpose of the Zero Energy Bylaw, while avoiding possible obstacles to implementation identified by Town officials. The following chart summarizes the major changes from the original bylaw that would be made by the proposed replacement Zero Energy Town Buildings Bylaw:

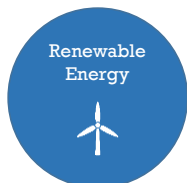
Current Zero Energy Bylaw	Proposed Zero Energy Town Buildings Bylaw
1. Compliance is based on the energy performance of the Project during 12 months of operation of the completed Project. The building administrator was to continue working towards zero energy compliance each year until achieved. [See current bylaw § 2.e.i]	1. Compliance is based on the modeled performance of the Project at the completion of the construction design documents, with zero energy capability certified by the Project's architect. The design will also be peer reviewed for zero energy capability. [See proposed bylaw § 3]
2. More challenging to determine at funding and contracting whether the Project is bylaw-compliant (since compliance is based on future operation).	2. Easier to determine at funding and contracting whether the Project is bylaw-compliant (since compliance is based on design, not future operation).
3. Required energy efficiency of the building or addition is implicit, but not explicit in bylaw. [See § 2.c]	3. Required energy efficiency of the building or addition is explicit in proposed bylaw. [§§ 1.a, 3.a, and Definition of "Zero Energy Capable"]

# Climate Zoning



- Set back exemptions for insulation
- Allowing energy-efficient technology by-right
- Special Permits and plan reviews
- Multi-pathway building standards
- Climate overlays
- Siting of public and shared infrastructure

## Use Case: Watertown Solar Zoning



New **Section 8.05**, and amend **Section 9.03(a)**, for an updated Solar Energy System Assessment

- Require projects of 10,000 s.f. or more or 10 or more residential units to include a solar energy system equivalent to 50% of the roof area of buildings as well as 90% of uncovered area of parking structures
- Provide exemptions for a lack of a solar-zone or for load feasibility
- Section 5.04: Amend/clarify that solar systems are not included in Building Coverage or Impervious Cover

<https://www.watertown-ma.gov/DocumentCenter/View/26235/2018-11-27-Zoning---Solar-Assessments>

## Use Case: Proposed Somerville Zoning



### By-Right Ultra-Low Emissions Building Systems

In order to foster further adoption of building systems that help to mitigate climate change by reducing GHG emissions or employing very low-emissions technologies, such as air-source heat pumps, Somerville should allow for these system components by-right. The goal of this language would be to future-proof zoning as well as to encourage new technologies and efficiencies that mitigate climate change.

This could include:

- Community Shared Solar Systems
- Solar Photovoltaic Panels and Solar Thermal Collectors
- Compressors and equipment for Air-Source Heat Pumps
- Energy Storage

# EcoRoof Requirement



## Solar Thermal System

A system to offset the heating load of the building by pre-heating the building's water with heat generated from solar collectors on the roof.



## White (or Cool) Roof

A finishing or surface that reflects more light than it absorbs, lowering the temperature of the air around it, and thereby helping to reduce urban heat island impacts.



## Renewable Energy Generation

This could be a solar photovoltaic system or a micro-scale wind generation system.



## Green Roof

A roof system with living green infrastructure with the purpose of mitigating urban heat, storing water, improving air quality, or as a location for urban farming.



## Blue Roof

A roof system employed in storm water management. This could be active or passive water storage and drainage systems.

# Climate Overlay Zone



## GHG Emissions Reductions Overlay Mechanisms:

### Buildings

- Require buildings to meet Passive House standards
- Allow for accessory dwelling units by-right
- Co-locate residential and commercial uses to enable ease of microgrid implementation

### Transportation

- Deploy Car-Free Zones
- Install protected bike and walking infrastructure
- Climate paving: Require new paving to be permeable to absorb stormwater, reduce run-off, and utilize albedo in order to mitigate urban heat island effect.
- Electric vehicle charging infrastructure: Require additional density of EV charging stations at perimeter parking spaces, and enable ZEV car sharing.

### Energy Source

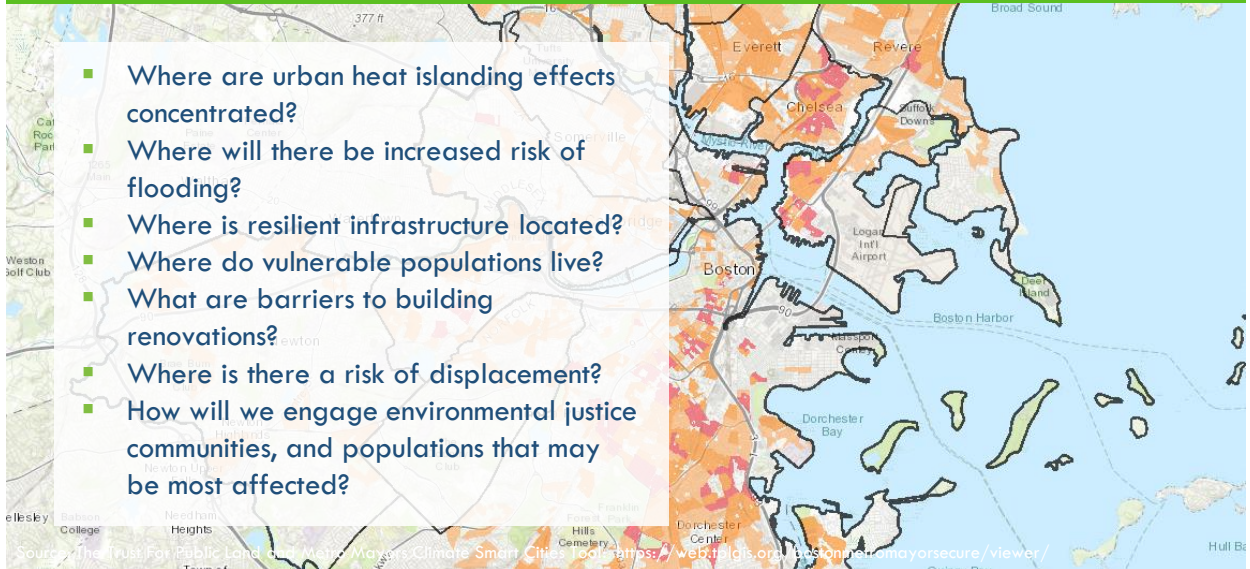
- Enable infrastructure for district heating and cooling systems
- Require onsite renewable energy, when feasible
- Require electrification of new buildings
- Allow community shared solar (CSS) by right
- Encourage battery storage and distributed renewables

### Open Space and Landscape

- Require stormwater management in roofs and pocket parks
- Increase Green Area Ratio requirements in the overlay
- Multi-use civic space: Encourage additional community gardens, shade trees, picnic tables and other infrastructure within civic zones to encourage public engagement in parks and open space.



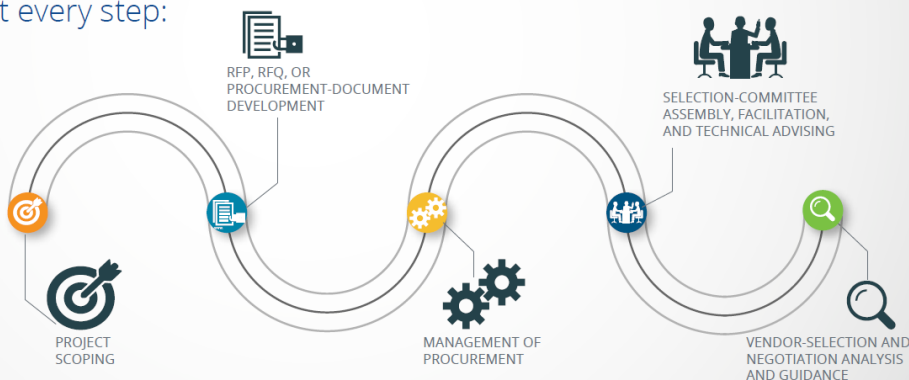
# Climate Zoning: Equity Considerations



# Municipal Playbook – Collective Action



We provide help — as much or as little as you need — at every step:



And ongoing advice and support throughout the process.

## Municipal Playbook – Community Choice Aggregation



The MAPC strategy effectively increases the state's minimum requirement for new renewable energy, helping to build even more renewable generation in our region.

Arlington  
Bedford  
Brookline  
Dedham  
Gloucester  
Hamilton  
Medford  
Melrose  
Millis  
Rockland  
Scituate  
Somerville  
Stoneham  
Sudbury  
Waltham  
Winchester



## Municipal Playbook – LED Streetlights



**2013 – 2016**

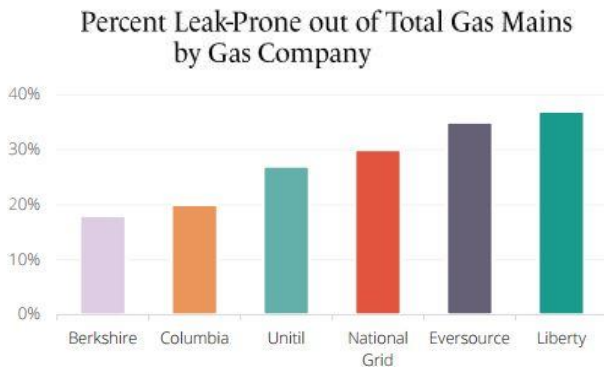
Provided technical and organized collective procurements to help over 30 municipalities retrofit 60,000 streetlights

**2017 - Present**

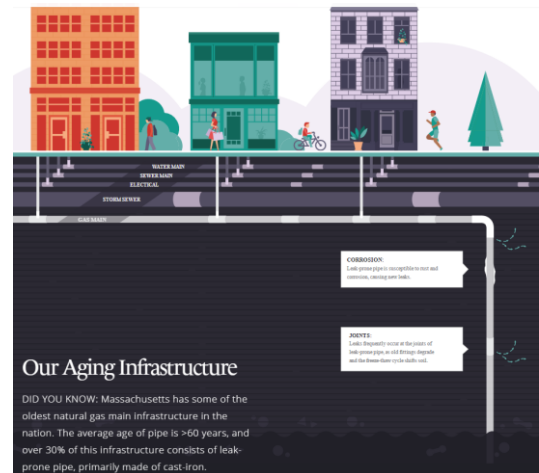
Currently working across Massachusetts with an additional 50+ municipalities to retrofit 80,000+ streetlights

**Annual Savings: 30,000 MWh • 12,000 MT GHGs • \$6 Million**

# Municipal Playbook – Gas Leaks



FixOurPipes.org



# State Policy: Global Warming Solutions Act

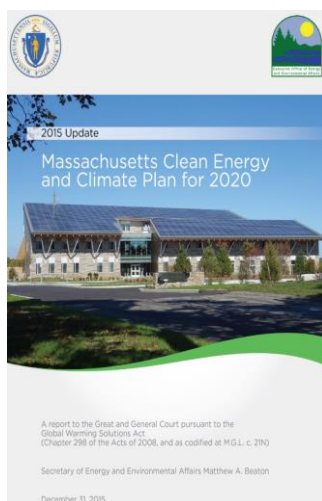
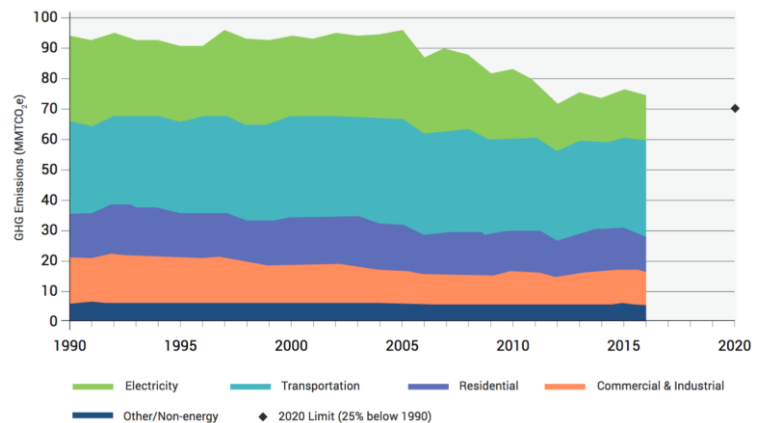


FIGURE 2 | MASSACHUSETTS GHG EMISSIONS, 1990 – 2016



Source: <https://www.mass.gov/files/documents/2017/12/06/Clean%20Energy%20and%20Climate%20Plan%20for%202020.pdf>

Source: <https://www.mass.gov/files/documents/2019/04/02/GWSA-10-Year-Progress-Report.pdf>

# State Policy: Energy Efficiency Advisory Council



## 2019-2021 Energy Efficiency Plan

- Record-high goals for energy efficiency savings
- Commitment from the PAs to provide monthly energy usage data by municipal, residential, and commercial and industrial sector customers
- Goals and programs designed to reduce peak demand on the electric grid during both summers and winters
- New offerings to support Passive House construction and energy storage
- Continued support for efficient LED streetlights
- **Commitment to develop and launch a municipal and community partnership strategy to improve municipal offerings and collaborate to enhance marketing and outreach efforts with residents and businesses, particularly those underserved.**





Thank you!



**Cammy Peterson**

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Metropolitan Area  
Planning Council

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