

ZERO to 101

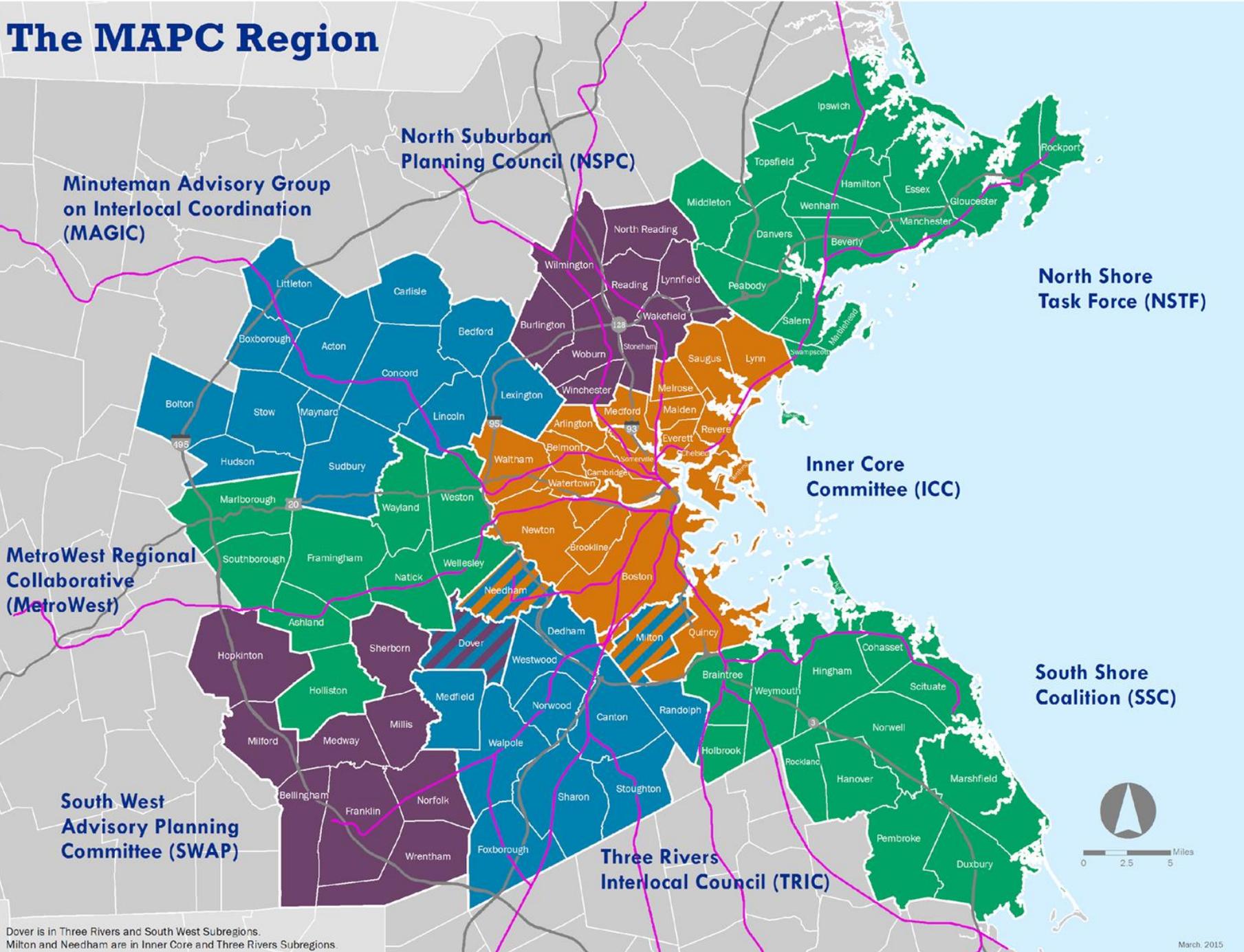
# Climate Zoning

Metropolitan Area Planning Council (MAPC)

June 25, 2019



# The MAPC Region



**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 EXPERTISE

## 1) Regional Energy Projects

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



## 2) Climate and Energy Planning

- Connecting municipalities with incentives + plug-and-play programs
- Community energy and climate data, baselining, planning, and strategizing
- Outreach programming and education
- Net Zero Planning



## 3) Energy Technical Assistance

- Grant Writing
- Green Communities
- Methane Leaks
- Data Analysis
- Solar Permitting and Zoning
- State and Local Policy
- Net Zero Resources
- Peak Demand Management

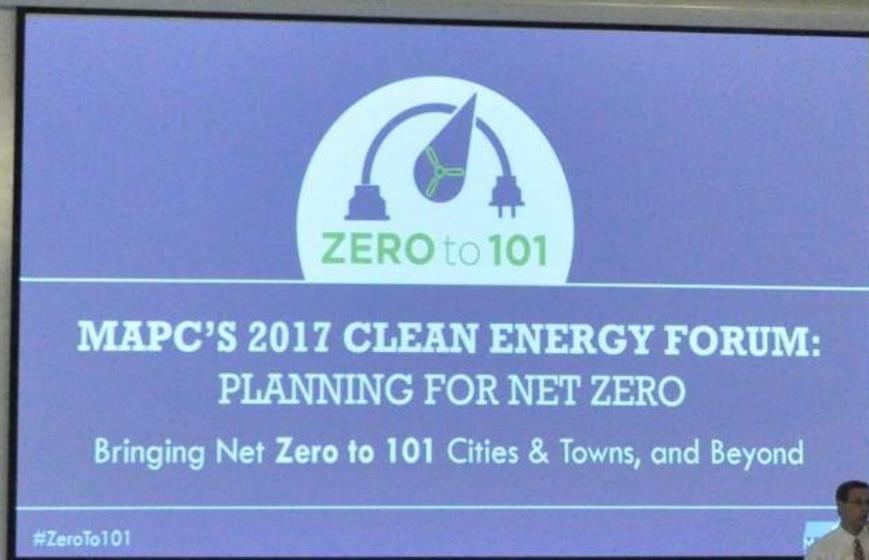


# Agenda

- 1 Welcome and Introduction
- 2 MAPC's Net Zero Work and Project Context
- 3 What Could Climate Zoning Look Like?
- 4 NEEP's Report and Case Studies
- 5 Discussion

# Net Zero Planning at MAPC

# Zero to 101 Initiative

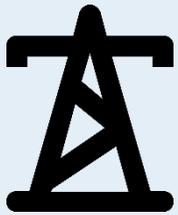


- 2017 MAPC Clean Energy Forum: Planning for Net Zero
- Net Zero Planning Resources Web Platform
- GHG Inventories
- Community Net Zero Planning
- Municipal Net Zero Playbook
- MetroCommon x 2050

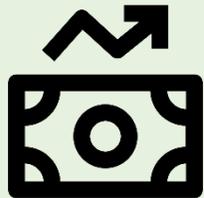
# Holistic Planning Framework

Focused on the benefits of carbon mitigation:

Energy



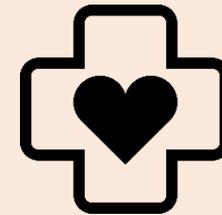
Economic



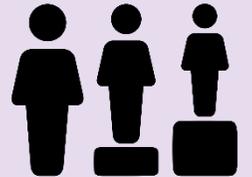
Environmental



Public  
Health



Equity



# Process



Recruit  
Support  
from  
Community



Pursue  
Commitment



Prioritize  
Holistic  
Planning



Gather  
Necessary  
Information

# What is Net Zero?



# Net Zero Municipality



Produces zero net carbon pollution; community gets as much electricity from renewable sources as it uses. Achieved through a combination of energy efficiency improvements, local clean energy production, and purchasing renewable energy

**Mass Power Forward**

# Net Zero



Refers to a building or a community of buildings for which, on an annual basis, all greenhouse gas emissions resulting from building operations are offset by carbon-free energy production

**Cambridge Net Zero Taskforce**

# Carbon Neutral

Existing  
Buildings



New  
Construction



Waste



Municipal  
Buildings



Transportation



Renewable  
Energy



Carbon  
Offsets



Climate-damaging emissions are reduced where possible and the remaining emissions are netted out through the purchase of carbon offsets

**United Nations**



<https://www.mapc.org/net-zero>

MAPC >> NET ZERO

ZERO TO 101

# Net Zero Planning

## INTRODUCTION

Net Zero goal-setting, planning, and implementation is a way to advance a community's carbon mitigation efforts. Net Zero planning offers each city or town the framework to form a scope of work and definition of Net Zero that meets its community goals and targets while taking tangible steps toward the need to keep global temperatures from rising above 1.5 degrees Celsius, as institutionalized within the Paris Climate Agreement. A community may determine, for instance, that it will next focus its net zero planning efforts on its largest source of emissions, such as building energy; on leading by example in the municipal sector as a starting point; or on going all-in with a community-wide net zero GHG emissions approach.



## FROM 101 TO NET ZERO

- [What is Net Zero?](#)
- [Planning Framework](#)
- [Process](#)
- [Net Zero Case Studies](#)
- [2017 Clean Energy Forum](#)

# Survey



Thank you for participating in this short survey!

MAPC's Clean Energy Team is conducting this survey as part of our Zero to 101 initiative in order to hear from our municipalities about their GHG mitigation processes. We are hoping to highlight work our Cities and Towns are doing both in our Clean Energy Newsletter and in case studies to share with the region. So don't be shy, please brag about your accomplishments!

This survey is for municipal officials, staff, or members of municipal committees such as sustainability committees who may be working on GHG mitigation efforts in their community. We plan to reach out to follow up with participants that would like to share more, so feel free to share this survey with your colleagues.

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## Getting to Know You

Name	<input type="text" value="Nicole"/>
Municipality	<input type="text" value="MAPC"/>
Title/ Role	<input type="text" value="Clean Energy Coordinator"/>
E-mail	<input type="text" value="nsanches@mapc.org"/>
Phone Number	<input type="text" value="(617) 933-0761"/>
Extension (if applicable)	<input type="text"/>

- ❖ GHG emission reduction targets
- ❖ Where you have been most successful
- ❖ Brag to us about your innovations and achievements!

# We Want to Hear From You!



In what area(s) has your community been most successful in advancing GHG emissions reductions? (Check all that apply)

Setting aggressive building and zoning standards

Motivating businesses and residents to take action

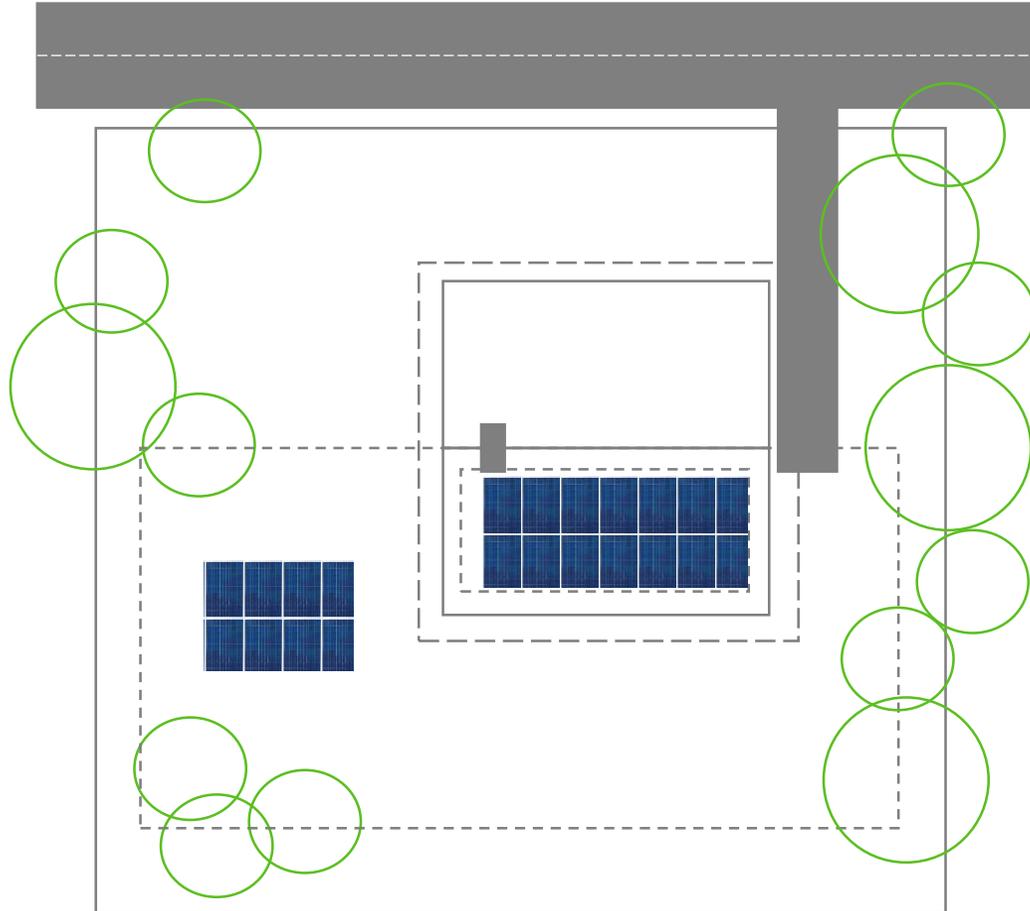
Coordinating with electric and gas utility partners

Creating multi-department collaborations on projects/planning efforts

- ❖ A short (30-45 min) follow up call
- ❖ The spotlight section of our Clean Energy Newsletter
- ❖ Net Zero Case Studies

# What Could Climate Zoning Look Like?

# Where Does Zoning Fit In?

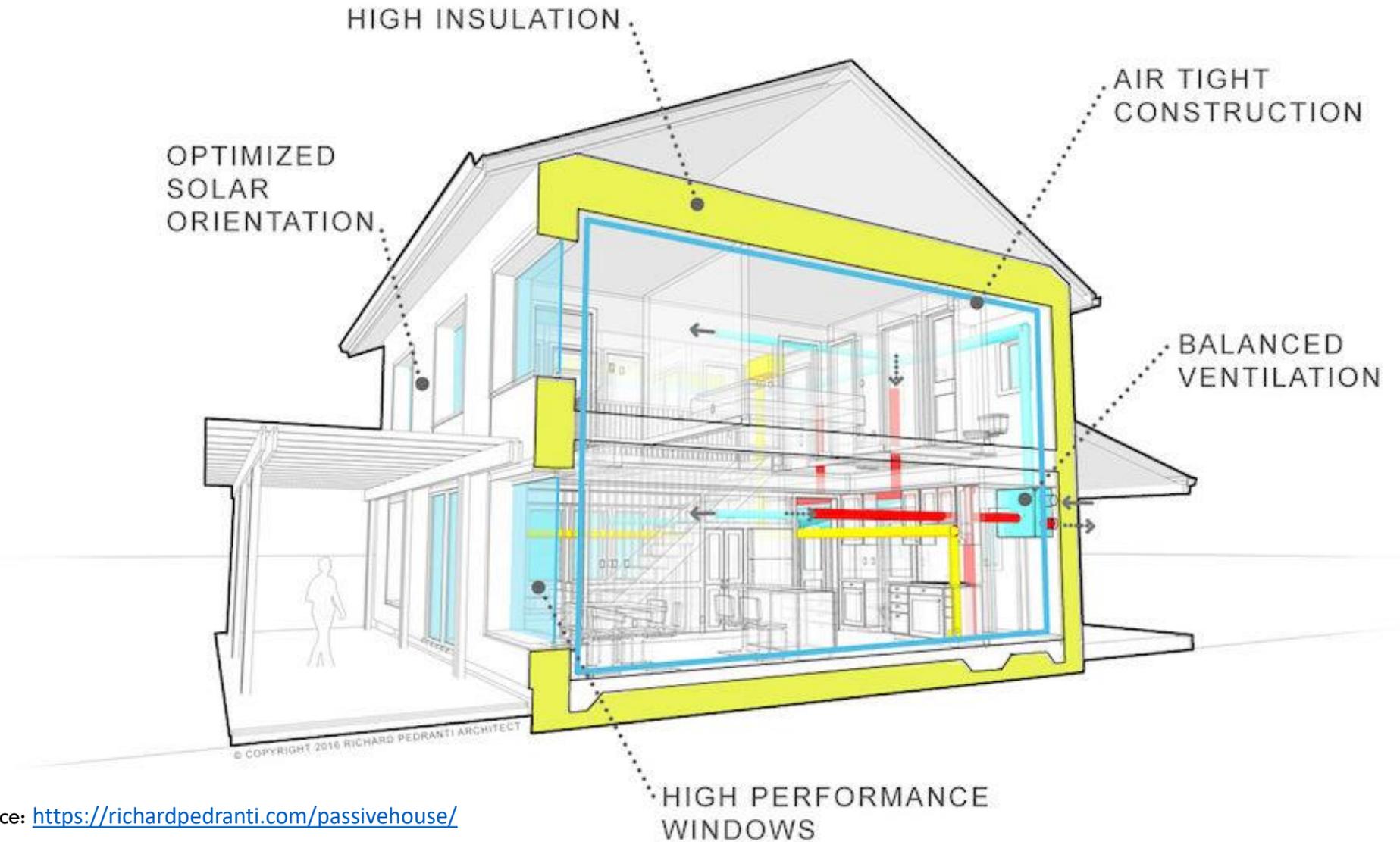


- Set back exemptions for insulation
- Allowing energy-efficient technology by-right
- Special Permits and plan reviews
- Multi-pathway building standards
- Climate overlays
- Siting of public and shared infrastructure

# Building Standards to Consider



# Resilient and Net Zero Buildings



# How Green Codes Work

Revised 12/28/10

## Green Factor Score Sheet

**SEATTLE** × *green factor* 

Project title: \_\_\_\_\_

enter sq ft of parcel

Parcel size (enter this value first) \*

**SCORE** -

Landscape Elements**	Totals from GF worksheet	Factor	Total
<b>A Landscaped areas (select one of the following for each area)</b>			
1 Landscaped areas with a soil depth of less than 24"	enter sq ft <input type="text" value="0"/>	0.1	-
2 Landscaped areas with a soil depth of 24" or greater	enter sq ft <input type="text" value="0"/>	0.6	-
3 Bioretention facilities	enter sq ft <input type="text" value="0"/>	1.0	-
<b>B Plantings (credit for plants in landscaped areas from Section A)</b>			
1 Mulch, ground covers, or other plants less than 2' tall at maturity	enter sq ft <input type="text" value="0"/>	0.1	-
2 Shrubs or perennials 2'+ at maturity - calculated at 12 sq ft per plant (typically planted no closer than 18" on center)	enter number of plants <input type="text" value="0"/> 0	0.3	-
3 Tree canopy for "small trees" or equivalent (canopy spread 8' to 15') - calculated at 75 sq ft per tree	enter number of plants <input type="text" value="0"/> 0	0.3	-
4 Tree canopy for "small/medium trees" or equivalent (canopy spread 16' to 20') - calculated at 150 sq ft per tree	enter number of plants <input type="text" value="0"/> 0	0.3	-
5 Tree canopy for "medium/large trees" or equivalent (canopy spread of 21' to 25') - calculated at 250 sq ft per tree	enter number of plants <input type="text" value="0"/> 0	0.4	-
6 Tree canopy for "large trees" or equivalent	enter number of plants <input type="text" value="0"/> 0	0.4	-

# Equity Considerations for Climate Zoning

- Where are urban heat islanding effects concentrated?
- Where will there be increased risk of flooding?
- Where is resilient infrastructure located?
- Where do vulnerable populations live?
- What are barriers to building renovations?
- Where is there a risk of displacement?
- How will we engage environmental justice communities, and populations that may be most affected?

# Local Example: Watertown Solar Zoning

Renewable  
Energy



## 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

# Local Example: Somerville Zoning Overhaul



<https://www.somervillezoning.com/>

## Proposed Code

Below is the current draft of the proposed new Somerville Zoning Ordinance. A change log and previous drafts are at the bottom for reference. To see what district your property is located under in the proposal check the [Zoning Atlas](#).

**Article 2: Overview & Guide** explains how the 'building type' based system of the proposed Ordinance functions, describes each line item from the building type tables, provides instruction for how to measure each requirement, and includes other standards and reference information.

### Public Hearings, Meetings, and Presentations

Land Use Committee Meeting (05/14/2019) - [Presentation](#), Video

Land Use Committee Meeting (04/30/2019) - [Presentation](#), Video

Maintained by the City of Somerville's  
Planning Department

Email us your feedback at:  
[planning@somervillema.gov](mailto:planning@somervillema.gov)

### Language Options

 EN  HT  PT  ES

Zoning Mailing List

# Somerville Zoning Recommendations

# Ultra-Low Emissions Building Systems



## 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 the code as well as to encourage new technologies and efficiencies that mitigate climate change.

This would include:

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

# Eco-Roof 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 Emission Reduction 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 islanding.
- 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 renewable energy

### **Open Space and Landscape**

- Require stormwater management in roofs and pocket parks
- Increase Green Area Ratio requirements within 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 Report and Case Studies

ne  
ep

# About NEEP

A Regional Energy Efficiency Organization



One of six REEOs funded in-part by U.S. DOE  
to support state and local efficiency policies and programs.

# Northeast Energy Efficiency Partnerships



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

## Mission

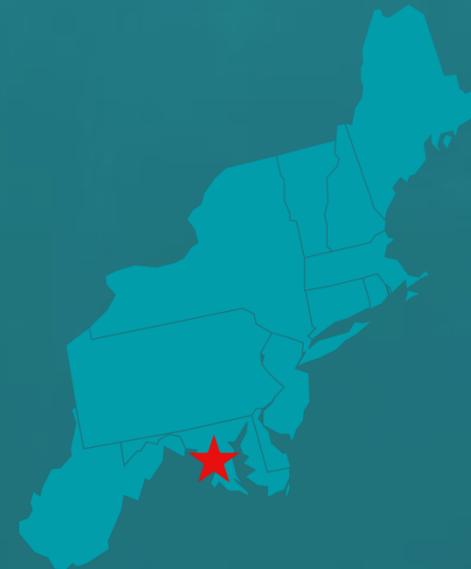
We seek to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities.

## 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



# Green Zoning: Using Local Zoning to Achieve Community Energy Efficiency and Resiliency



# Precursor to Climate Zoning Update

- Draft a climate action plan
  - Sets local sustainability and energy goals
  - Identifies areas of focus in terms of climate impact
  - Outlines strategies for achieving goals in each area
  - For the topic of buildings, MA communities often run up against the Building Code in terms of requiring energy savings above the code.
    - Climate Zoning can HELP!!



## Case Studies

# Case Study: Northampton, MA

- **Urban Residential Sustainable Growth Overlay District:**

- Buildings have to meet one of two requirements:

- HERS rating of 47 or lower : 1,200 sq. ft. or less
- HERS rating of 41 or lower: larger than 1,200 sq. ft.

OR

- LEED Gold for new construction or LEED Gold in Neighborhood Development

Other Option: A density bonus can be used to incentivize developers to meet a LEED certification for higher density allowances

- Density bonus can also be used for incentivizing affordability

# Case Study: Somerville, MA



- Green Score:
  - performance-based environmental landscape standard with a weighted point system that incentivizes landscape and site design elements that:
    - Reduce storm water runoff
    - Improve urban air quality
    - Mitigate urban heat island effect
    - Improve general well being of residents and visitors

# Case Study: Denver, CO

- Denver Green Building Ordinance
  - Offers flexible pathway for compliance of green building ordinance
  - NEW BUILDINGS (25,000 SQ. FT. AND UP) & ADDITIONS (50,000 SQ. FT. AND UP)
    - Cool Roof requirement

AND ONE OF THE FOLLOWING:

- Payment into green building fund
- On-site solar
- Purchase off-site solar energy
- Energy conservation of at least 12% above code req.
- Green building certification

# Other Climate Zoning Pathways



- Specify building orientation to maximize daylighting
- Require covered parking in commercial districts to reduce heat island effect
- Minimum Solar Reflectance Index (SRI) requirements for roofs in commercial/industrial districts
- Exempt overhang and/or exterior wall thickness from counting toward gross sq. ft. if it contributes to tighter building envelope and energy efficiency
- Building fenestration standards to promote passive solar

**Thank You!**

**For more information, contact:  
kpdunning@neep.org**

# Q & A

Please type in questions in the Q & A chat box

# Contact

**Kai Palmer Dunning**  
**Buildings and Communities**  
**Associate**  
**NEEP**  
[kpunning@neep.org](mailto:kpunning@neep.org)  
**781-860-9177 x114**

**Nicole Sanches**  
**Clean Energy Coordinator**  
**MAPC**  
[nsanches@mapc.org](mailto:nsanches@mapc.org)  
**(617) 933-0761**

**Cammy Peterson**  
**Clean Energy Director**  
**MAPC**  
[cpeterson@mapc.org](mailto:cpeterson@mapc.org)  
**(617) 933-0791**