ZERO to 101

Climate-Smart Zoning and Permitting

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MAPC

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Contents

MAPC's Municipal Net Zero Playbook

MAPC's Municipal Net Zero Playbook ("the Playbook") provides guidance and tools to equip cities and towns with the resources to tackle their climate goals in an efficient and equitable manner. The Playbook is an interdisciplinary tool for municipal planners, energy/sustainability staff, and community members that seeks to empower cities and towns to implement net zero actions within their communities. These resources will help local net zero action implementers understand their role in advancing greenhouse gas (GHG) emissions reductions, adopting local policies, and accelerating state-level policy changes.

Explore all of MAPC's resources on Net Zero Planning: https://www.mapc.org/net-zero/

How to Use the Playbook

START HERE

MAPC developed two guiding frameworks to help communities navigate the Net Zero approach as they start on, or ramp up, their Net Zero journeys. Cities and towns can use these frameworks to inform community engagement, plan development, and strategy prioritization as they seek to customize their local Net Zero Action Plans.

Framework for Action

Learn how to navigate the Net Zero planning process and evaluate priority actions for a local net zero plan.

Framework for Equity

Learn how to develop Net Zero Plans that assess and acknowledge existing inequities and work to uplift and provide direct benefits to underserved communities.

Zero Emissions Mobility

Tackle GHG emissions reductions from how people get around a community.

Net Zero Buildings

Make buildings highly efficient and optimize clean energy for electricity, heating, and cooling.

Clean Energy Supply

Transition to 100 percent renewable sources of energy across a community.

Climate-Smart Zoning and Permitting

Take a strategic approach to local zoning and permitting updates.

CHOOSE YOUR OWN ADVENTURE

Drawing on our years of experience working with cities and towns on clean energy and climate, MAPC has compiled information on the best practices and actions municipalities can implement in their plans to advance toward Net Zero. You can start with the Chapter you are most interesting in tackling, or review each in depth.

The Playbook provides a starting point for each priority action, with links to resources, at MAPC and beyond, that offer more detailed guidance on implementation.

WHAT'S NEXT?

As our work with communities expands, we plan to continue to add and update chapters to the Playbook that touch on emerging best practices.

In order to guide our communities to net zero emissions by 2050, we must adjust zoning and permitting policies and practices to require and encourage the necessary changes to our building stock today and into the future.

This chapter outlines opportunities for municipalities to demonstrate leadership in zoning and permitting. The buildings sector comprises a large percentage of greenhouse gas emissions, and buildings constructed or renovated today will last for decades to come. Municipal zoning and permitting processes can help leverage a shift to low-carbon buildings and make a huge impact on current and future emissions. The recommendations in this chapter include best practices that have been utilized for some time, as well as emerging innovative practices.

The following strategies for **Climate-Smart Zoning and Permitting** provide your community with recommended actions that draw on best practices and innovations from across the Commonwealth of Massachusetts and country to:

Allow net zero enabling technologies by-right

Establish climate zoning overlays

Mandate energy efficiency and renewable energy as appropriate

Streamline and expedite permitting for net zero buildings

The Playbook provides a selection of priority actions to advance each of these strategies in your community. Each action's urgency factor of 2025, 2030, or 2050 provides a recommended timeframe by which to fully implement the action. For each action, the Playbook outlines the **action type**, **urgency**, **timeframe**, **local and national examples**, **scale of impact**, **type of expense**, **lead implementer and key partners**, and **performance indicators**. Where available, we have also identified funding opportunities and tools to measure action impacts.

Playbook Indicators

Timeframe to Implement

Short-term *(Less than one year)*

Intermediate *(1 to 5 years)*

Long-term *(5 years or more)*

Ongoing

Type of Expense

Staff

Capital

Operations

Benefits and Impacts

The listed benefits and impacts are in addition to reductions in greenhouse gas emissions.

Equity

Environmental

Economic

Energy

Health

Calculating Tool

Playbook Terms

Type Actions are sorted into the categories of advocacy, financing, plan, policy, program, or outreach.

Urgency Each action is assigned an urgency factor of 2025, 2030, or 2050, providing a recommended year by which to fully implement the action.

Feasibility A sampling of local, national, or international examples is provided to illustrate on-the-ground implementation. Some actions we have assessed to be impactful have not yet been demonstrated in other communities – these actions are identified as leadership opportunities.

Lead Implementer Each action includes a suggested municipal staff person or department responsible for leading the execution of the action and any decision-making involved. This will differ from community to community.

Key Partner(s) We identified partners within the municipality and the broader community who will be critical to successful implementation of the action.

Scale of Impact Actions have been identified as either an enabling action, hard to measure and high impact, or measurable and high impact. A high impact action is based on whether or not there is a direct connection with emissions reductions within a priority sector. Enabling actions may not have a direct connection to emissions reductions, but they are essential to put in place early on to support greater emissions reductions over time.

Performance Indicators Each action includes suggested metrics to track success and impact during implementation of the action.

How to use this chapter

Since developing, refining, and approving zoning language can take some time (at least a year or more), we recommend that municipalities consider pursuing multiple zoning actions at the same time, and begin as early as possible. It may make sense to plan for an initial round of zoning language changes, and then a second or third round as the community progresses onto other net zero targets.

For instance, a municipality may approve net zero definitions (**Action B**) and establish a climate overlay (**Action D or E**) in an initial article, and then later broaden some of the changes in the overlay to apply community-wide or adopt a Green Factor (**Action H**). Adopting multiple actions together into zoning allows for the city or town to carefully consider how each portion of the zoning code or the bylaws will interact with one another. A municipality may also consider adopting climate zoning changes as part of a larger zoning overhaul if the community has one planned in upcoming years.

Throughout these actions, it is beneficial to engage stakeholders within municipal government and across the community, including equity stakeholders,[1] to create a holistic process for zoning and permitting. The process should be clear to all departments involved in permitting and plan approval and should align with municipal goals. Once a municipality has successfully adopted net zero zoning language and streamlined permitting, consider developing a net zero zoning guide and permitting checklist to make it easy for developers to follow new policies and to create consistency.

Throughout this chapter, we highlight zoning actions that Massachusetts municipalities can take to advance net zero in their communities. Since zoning language legally cannot conflict with the State Building Code,[2] Massachusetts municipalities may want to pair the adoption of these zoning and permitting actions with advocacy for a highly efficient building code to complement them. Communities can provide testimony and written comments on the State Building Code through the Board of Building Regulations and Standards (BBRS)[3] or propose changes and vote on national codes through the International Code Council (ICC).[4] Municipalities should consider pursuing Action H from the Net Zero Buildings Chapter to engage in this advocacy. MAPC's Codes for Climate[5] webpage has more information on these actions and other ways municipalities can engage on building codes.

Strategy:
Allow net zero enabling technologies by-right

Net Zero Enabling Technologies

In this chapter, **net zero enabling technologies** are defined as those technologies that either 1) significantly increase energy efficiency, 2) allow for a structure to avoid onsite combustion of fossil fuels or to source renewable energy, or 3) store energy generated from renewable sources onsite.

There is a lot of innovation within this field, as new technologies are being developed, tested, scaled up, and improved upon. Many of these technologies are decreasing in costs, as technology improves and supply chains grow, making them more financially attractive solutions for developers.

Category	Example Technologies
Energy Efficiency	• Triple-glazed windows • Ground-, air-, and water-source heat pumps • High R value insulation • Cool or green roof
Renewable Energy	• Solar photovoltaic (PV) • Solar hot water • Solar space heating • Ground-, air-, and water-source heat pumps • Onsite wind turbines
Energy Storage and Management	• Battery storage • Thermal energy storage • Electric vehicle (EV) charging infrastructure

Action A:

Allow by-right the installation and operation of net zero enabling technologies.

Type
Policy

Timeframe
Short-term
(Less than one year)

Urgency
By 2025

Feasibility
Leadership opportunity – look to DOER's Massachusetts Model Solar Zoning[6]

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department

Lead Implementer
Select Board / City Council

Performance Indicators
- Number of permits for enabling technology
- Number of clean energy systems installed

Scale of Impact
Hard to measure/ high impact

Type of Expense
Staff time

Benefits and Impacts
Energy - Reduced energy load through use of energy efficient technologies. Reduced fossil fuel consumption
Environmental - Reduced indoor and outdoor air pollution
Economic - Lower electric and heating energy costs

Allow by-right the installation and operation of net zero enabling technologies.

Some net zero enabling technologies may require local zoning permits for installation. This typically includes solar PV, solar hot water, eco-roofs, and other mechanical equipment that is installed outside the building envelope (such as on the rooftop or within setbacks). This type of equipment will likely be subject to local zoning restrictions and may require additional permits or special permits to be installed.

- Streamline and expedite local permitting processes by allowing net zero enabling technologies to be installed by-right in the majority of zones, rather than requiring additional permits.
- Create a process by which the Inspectional Services Department, the Zoning Board, and developers have a shared understanding of what makes these technologies safe and suitable within the municipality.
- Provide additional training, checklists, and other process documentation to clearly outline what is allowed for which zones (see **Actions L** and **K**).

Equity Considerations

Municipalities should engage with populations identified in the community's Equity Assessment (see MAPC's Framework for Equity[7]) to plan for which technologies this action will include. Like other zoning actions, the locations in the municipality where this action is implemented will have an impact on equity. Municipalities implementing this action in phases or only in certain zones should consider choosing areas where the action will benefit renters, people of color, low-income residents, and other identified populations.

Immediate Next Step

Municipalities will need to determine which technologies to include and what language is appropriate for their local zoning code. The Massachusetts Department of Energy Resources' (DOER's) Model Solar Zoning[8] is a good starting point for model language. DOER's model language establishes by-right zoning for solar energy, which could be adapted to define and include additional technologies.

Explore MAPC's resources on climate zoning:
https://www.mapc.org/resource-library/climate-zoning/

Action B:

Include net zero enabling technology and related terms in zoning definitions.

Type
Policy

Timeframe
Short-term
(Less than one year)

Urgency
By 2025

Feasibility
Local examples – Natick Solar Zoning Definitions Section[9]; Massachusetts Model Solar Zoning[10]

Lead Implementer
Select Board / City Council

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department

Benefits and Impacts
Energy – Reduced energy load through use of energy efficient technologies
Environmental – Reduced indoor and outdoor air pollution
Economic – Lower electric and heating energy costs

Type of Expense
Staff time

Scale of Impact
Enabling action

Performance Indicators
- Number of permits for net zero enabling technologies
- Number of clean energy systems installed

Include net zero enabling technology and related terms in zoning definitions.

Municipalities can take a foundational first step to adopting climate-smart zoning by defining net zero terms, such as "net zero" and "solar energy system", in the Definitions section of the Zoning Ordinance. Defining terms provides clarity in the interpretation of the zoning ordinance, both for developers and building inspectors.

- Include definitions for any technology with a specified use in the zoning code, including those allowed by-right **(see Action A)** or by special permit.
- For some technologies, like solar or storage, it may be appropriate to designate different definitions based on size or capacity of the system, which could influence their impact on land use.
- Consider including definitions for technologies that the community may want to encourage in the future, such as microgrids, water-based district heating and cooling, or vehicle-to-grid technology.

Definitions can either be integrated into the zoning code in the current Definitions section, or as a separate net zero enabling technologies ordinance. As with any zoning change, zoning and planning staff should make sure to consult municipal counsel throughout the process.

Equity Considerations:

Municipalities should include definitions for community shared solar and other equity-focused clean energy structures that can ensure benefits for low-income residents and other vulnerable groups. The exercise of determining which technologies and actions should be included can be combined with an Equity Assessment.[11]

Immediate Next Step:

Municipalities should determine which zoning actions from this chapter align with the community's net zero target and other goals. From this list of zoning actions, the additions to the Definitions section should include any technologies or terms that will help to achieve these actions.

Explore MAPC's resources on climate zoning:
https://www.mapc.org/resource-library/climate-zoning/

Additional Zoning Ordinance Resources

Green Zoning: Using Local Zoning to Achieve Community Energy Efficiency and Resiliency[12]: This guide was developed by Northeast Energy Efficiency Partnerships (NEEP) to provide case studies on how green zoning measures can be applied in Massachusetts cities and towns.

New York Battery Energy Storage System Guidebook for Local Governments[13]: This resource was developed by the New York State Energy Research and Development Authority (NYSERDA) to support cities and towns in planning for and managing the deployment of energy storage in their communities. The guide includes model laws, permits, and electrical checklists.

Renewable Energy Ordinance Framework – Geothermal[14]: This guidance document was developed by the Delaware Valley Regional Planning Council's (DVRPC) Alternative Energy Ordinance Group. The document provides example ordinance language and guidance on how municipalities could approach incorporating the language locally.

Guide to Streamlining the Solar PV Permitting Process and Developing Supportive Zoning Bylaws[15]: MAPC developed this solar permitting and zoning toolkit to support municipalities in increasing solar adoption across their community.

Massachusetts Model Solar Zoning Ordinance[16]: The Massachusetts Department of Energy Resources (DOER) developed model language for cities and towns to use to support the deployment of solar PV in their communities.

Solar Energy Toolkit for Local Governments[17]: SolSmart developed a toolkit for municipalities on supporting the growth of solar energy. This section of the toolkit focuses on how local governments can use planning, zoning, and development as tools to facilitate solar growth.

How and Why to Permit for Small Scale Wind Systems[18]: This report developed by the American Wind Energy Association covers the ins and outs of small-scale wind system deployment at the local level.

Climate Resilient Land Use Strategies[19]: This online resource compiles example regulatory language and policies that can be used to increase climate resilience in Massachusetts, including the impacts of flooding, drought, and heat.

Timeframe
Short-term
(Less than one year)

Urgency
By 2025

Feasibility
Local examples –
Natick Solar Zoning[20]

Lead Implementer
Select Board / City Council

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department

Type
Policy

Action C:

Exempt net zero enabling technologies from height and setback requirements.

Performance Indicators

- **Number of permits for enabling technology**
- **Number of net zero enabling systems installed, by type**

Scale of Impact
Enabling action

Type of Expense
Staff time

Benefits and Impacts
Energy – Reduced energy load through use of energy efficient technologies
Environmental – Reduced indoor and outdoor air pollution
Economic – Lower electric and heating energy costs

Exempt net zero enabling technologies from height and setback requirements.

Height and setback requirements determine how tall and how close to the property lines structures can be within a particular zone. Some height and setback requirements can cause unintentional barriers to installing net zero enabling technologies or increase installation costs and timeline. For example, height requirements may make it more difficult for buildings to install rooftop solar PV if they are already built to the maximum height, and other mechanical equipment may need to get special permits if located within a setback. By exempting appropriate net zero enabling technologies, such as those that are accessory use by-right, the municipality can help reduce costs and approval timelines and encourage the integration of these technologies in designs and retrofits.

A municipality should consider exemptions for additional insulation to improve energy efficiency, rooftop solar PV, rooftop solar thermal, eco-roofs, accessory energy storage, and heat pump equipment, from height and setback requirements (where appropriate). For example, a rooftop solar PV system may require a few inches of space between the roof surface and the panels to function optimally, and for electrical boxes and a disconnect switch to be installed on the side of a building. Exemptions enable the addition of solar more easily into the building footprint without having to sacrifice height or setback space. Moreover, setback exemptions can obviate the need for a developer to have to choose between ample living space and the additional insulation and other weatherization measures needed to construct a better building envelope.

This is an enabling action that improves the impact of by-right zoning **(Action A)**, as well as other net zero zoning actions.

Equity Considerations

The setback exemptions are particularly relevant in densely populated areas and areas with smaller lot sizes, as these lots will have competing needs that need to be met in a small space. Allowing smaller homes and apartments to expand their building envelope provides more opportunity for low-income residents and renters to benefit from the resiliency, comfort, and cost savings of more robust building shells, lower heating and cooling loads, and improved indoor air quality. Buildings in communities with the most need should be prioritized and supported to maximize these benefits.

Immediate Next Step

Municipalities can get started by reviewing their existing zoning and determining what unintentional barriers may already exist. They can also review current compliance by existing buildings with height restrictions and setback requirements. If most existing structures are out of compliance already, it may be worth including further exemptions or exempting net zero enabling technologies entirely so that efforts to enforce non-compliance do not trigger a zoning review or other additional burdens for prioritized projects.

Strategy:
Establish climate zoning overlays

Action D
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Action D:

Create a climate overlay zone that reduces greenhouse gas (GHG) emissions per building type.

Type
Policy

Timeframe
Intermediate
(1 to 5 years)

Urgency
By 2030

Scale of Impact
Measurable / high impact

Type of Expense
Staff time and capital, including for emissions modeling and zoning enforcement

Benefits and Impacts
Energy – Reduced fossil fuel energy use in building stock to comply with GHG caps, and associated energy demand reductions from increased energy efficiency
Economic – Reduced energy costs
Health – Improved indoor air quality

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department, Building Owners

Feasibility
Leadership opportunity – look to NYC Local Law 97[21] and Institute for Market Transformation Building Performance Standards[22]

Lead Implementer
Select Board/City Council

Performance Indicators
- Percentage of buildings in compliance with GHG caps
- Number of new Net Zero buildings constructed

Create a climate overlay zone that reduces greenhouse gas (GHG) emissions per building type.

Similar to **Action A** in the Net Zero Buildings Chapter[23], this type of climate overlay zone is another mechanism that could be instituted to set a maximum annual GHG emissions cap per square foot for buildings located within a defined boundary.

Determine the initial maximum GHG emissions per square foot for different building types (i.e., commercial, single family, and multi-family) located within the overlay zone. For **form-based zoning**, the maximum can more easily be formatted by building type across different zones since these categories will likely already be established. For **traditional zoning**, the building types that are present within the specific overlay boundary will need to be categorized.

- ○ Establish a stakeholder process to enable different building interests, occupants, and experts to participate in the cap determinations and timeline.
- ○ Consider phasing in more challenging building types or functions and lowering the caps over time.

Continued on the next page.

Choose **compliance and enforcement mechanisms** best suited to your community.

- Two potential compliance pathways include requiring the building developer to either complete GHG emissions modeling at the time of construction or benchmark the building's operational emissions from a set year. Either pathway requires annual reporting for tracking compliance.
- Noncompliance could be addressed through fines or alternative compliance payments, both of which could be collected by the municipality to help support low- to moderate-income building owners and environmental justice communities to comply with the overlay.

This action is one of the most direct ways to drive GHG emissions reductions through zoning but will require robust and thoughtful planning to deploy successfully. Implementation can also be tied to a robust building energy use disclosure ordinance to support data collection and analysis and ensure compliance (see **Action B** of the Net Zero Buildings Chapter).

Equity Considerations

Municipalities should consider pairing this action with affordable housing requirements. One approach could be to encourage affordable net zero housing for the municipality's most vulnerable residents. Another approach to implementation could be to strengthen tenant rights while establishing the overlay in multi-family zones. Additionally, municipalities should consider dedicating the revenue raised through any noncompliance fees or alternative compliance payments to support for low- to moderate-income building owners and environmental justice communities.

Immediate Next Step

Communities should begin with a thorough greenhouse gas inventory to get an understanding of the emissions for which the building sector in the community is currently responsible. Further analysis will be needed to separate these emissions into different building categories (i.e., types of commercial properties), and enable the municipality to set appropriate GHG emissions reduction targets by building type.

Explore MAPC's Community Greenhouse Gas Inventory Tool to establish a baseline of community-wide emissions: https://www.mapc.org/resource-library/community-ghg-inventory-resources/

Check out MAPC's resources on Climate Zoning: https://www.mapc.org/resource-library/climate-zoning/

Action E:

Create a climate overlay for high performance building standards.

Type
Policy

Timeframe
Intermediate
(1 to 5 years)

Urgency
By 2030

Feasibility
Leadership opportunity – look to Boston, MA, Green Building Guidelines[24]; Somerville, MA, 2019 Zoning Ordinance[25]

Scale of Impact
Hard to measure / high impact

Performance Indicators
- Compliance with climate overlay
- Modeled energy use reductions
- Modeled or reported GHG reductions

Lead Implementer
Select Board / City Council

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department, Building Owners

Type of Expense
Staff time

Benefits and Impacts

Energy – Reduced energy use in building stock from the development of more energy efficient buildings

Economic – Reduced energy costs and maintenance costs for buildings

Health – Improved indoor air quality from weatherization measures and elimination of on-site combustion

Create a climate overlay for high performance building standards.

Within this type of climate overlay zone, buildings will be required to meet one of a menu of high-performance building standards, such as Passive House,[26] LEED Zero,[27] or Living Building Challenge,[28] with multiple pathways for compliance.

This overlay accomplishes many of the same objectives as a GHG emissions cap climate overlay (**Action D**), while potentially being easier to track compliance. High performance building standards require developers to meet a certain number of points or choose certain energy efficiency, climate, resilience, and renewable energy measures to include in the building and landscape design. It is essential that the chosen building standard or standards have a variety of ways for a developer to comply to not unintentionally overlap with the building code. However, due to this flexibility, this action does not have as direct an impact on GHG emissions as the GHG emissions cap overlay.

The LEED standards have some precedent in municipal zoning code, such as in the City of Boston's zoning[29], City of Cambridge Section 22.000[30], and City of Somerville's Development Standards[31] LEED certification can be met via measures in various sectors, ranging from energy to waste and water use in a building. While compliance with LEED silver, gold, or platinum standards may be less impactful on GHG emissions than other more rigorous standards such as Passive House, Living Building Challenge, and LEED Zero, by offering a menu of compliant standards, a community can offer choice within high-performance bounds. Communities may also want to consider combining this action with a Green Code to incentivize green infrastructure (**Action H**).

Equity Considerations

The location of the overlay will have a direct impact on where highly efficient buildings are located, and thus who will live, work, and spend time in them. It is worth thinking through where this overlay can best benefit residents who would not otherwise get the benefits of a high-performance building. Municipalities can also consider including healthy-living or landscape standards such as WELL[32] or SITES[33] in collaboration with high-performance building standards in order to emphasize holistic goals of achieving co-benefits such as health, safety, and resiliency.

Immediate Next Step

Municipalities should explore different high-performance building standards to determine which may best fit the community's goals. Municipalities should look for building standards for which the options for compliance are weighted in alignment with municipal goals. For instance, a municipality that has not yet seen much high-performance construction may wish to include LEED gold or silver in the menu to provide developers a range of stringency in the standards available.

Check out MAPC's resources on Climate Zoning:
https://www.mapc.org/resource-library/climate-zoning/

High Performance Building Standards

LEED (Leadership in Energy and Environmental Design)[34] is one of the most widely used green building rating systems globally. LEED certification can be pursued for virtually all building types and provides a framework for healthy, highly efficiency, and cost-saving green buildings.

LEED Zero[35] complements LEED and verifies the achievement of net zero goals. LEED projects can achieve LEED Zero certification when they demonstrate any or one of the following: net zero carbon emissions, net zero energy use, net zero water use, or net zero waste.

The Living Building Challenge[36] is an international sustainable building certification program. Living Buildings are defined as regenerative buildings that connect occupants to light, air, food, nature, and community, and remain within the resource limits of their site. The Living Building Challenge is organized into seven performance areas: place, water, energy, health and happiness, materials, equity, and beauty.

Passive House[37] is a building performance standard that focuses on efficient building design with low energy consumption. This could be achieved through quality design paired with continuous insulation, high-performance windows, and heat recovery ventilation. In addition to energy efficiency, passive buildings offer long-term benefits such as minimal energy consumption, better indoor air quality, and increased building resiliency.

The WELL Building Standard[38] provides a framework for buildings and organizations to create spaces that enhance human health. WELL strategies advance health by setting performance standards for design interventions, operational protocols and policies, and commitment to foster health and wellness. Spanning ten concepts with specific health intents, WELL Certification offers a roadmap for improving the quality of air, water, and light with mindful design decisions.

Urgency
By 2025

Timeframe
Short-term
(Less than one year)

Feasibility
Local examples – Growing Station Areas ETOD[39]; South Salem Transit Oriented Development[40]

Scale of Impact
Hard to measure / high impact

Lead Implementer
Select Board / City Council

Key Partners
Planning Department, Transportation Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department

Type
Policy

Action F:

Enable and incentivize transit-oriented development (TOD).

Performance Indicators

- Number of vehicle miles traveled within municipality
- Number of affordable units built within an overlay or district
- Number of parking spaces within an overlay or district

Type of Expense
Staff time and capital (if paired with infrastructure changes)

Benefits and Impacts
Economic – Reduced transportation and housing costs for multi-family units
Health - Improved physical and mental health outcomes from active mobility and shorter commute times
Environmental - Improved outdoor air quality

Enable and incentivize transit-oriented development (TOD).

Transit-oriented development encourages increased proximity and access to public transit and active modes of getting around. This can address the challenges for the first and last mile of a commute and provide a more connected and car-free commute through options such as walking and biking. TOD should benefit residents who utilize public transportation and are able to limit the use of single passenger vehicle trips.

- Allow for and incentivize high density and mixed-use buildings close to transit centers such as T-stops, commuter rail stops, bus stops, and bike infrastructure.
- Allow for lower parking minimums for development within walking distance of public transit.
- Discourage and/or re-locate parking away from transit centers in denser municipalities; in suburban and rural municipalities, co-locate parking and transit centers to encourage use of public transit.
- Demonstrate leadership by establishing a car-free block or neighborhood, re-locating parking to the perimeter of the block, and re-purposing roadways in the center for bikes, pedestrians, and green space.

Equity Considerations

In creating the transit-oriented development overlay or district, municipalities should take care to hear lived experiences of residents who rely on public transit, and those who walk and bike for transportation. An overlay or district can be designed to include additional requirements for affordability and community amenities. This recommendation should also be paired with strategies that preserve affordable housing, such as community land trusts, and protect against displacement.

Immediate Next Step

Refer to the MAPC Growing Station Areas resource through which municipalities can identify community goals and options that may be a good fit given the types of transportation that would be emphasized. Those communities serviced by the MBTA should refer to guidance from the Massachusetts Department of Transportation and the MBTA on the requirements enacted by the Housing Choice legislation in 2021.[41] Through this legislation, all MBTA communities must have at least one multifamily district of reasonable size permitted by right.

Explore MAPC's work with communities on TOD:
https://www.mapc.org/transportation/

Strategy:
Mandate energy efficiency and renewable energy as appropriate

Action G :

Require all new construction and roof replacements to implement an eco-roof.

Type
Policy

Timeframe to Implement
Short-term
(Less than one year)

Urgency
By 2025

Type of Expense
Staff time

Scale of Impact
Hard to measure/ high impact

Feasibility
Local examples and national examples – Watertown, MA - Solar Requirement[42]; Cambridge, MA – Green Roofs[43]; Toronto, Ontario - Green Roof By-Law[44]; NYC Cool Roofs Ordinance[45]; Philadelphia, PA - Blue Roofs[46]

Performance Indicators
- Square footage of eco-roofs implemented
- kW of solar installed
- Gallons of stormwater diverted

Lead Implementer
Select Board / City Council

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department

Benefits and Impacts
Energy – Increased renewable energy through the development of new rooftop renewable systems. Lower building energy demand.
Economic – Reduced heating and cooling loads leads to savings on energy bills.
Environmental – Reduced urban heat island effect and mitigation of stormwater runoff. Improved outdoor air quality due to addition of green infrastructure, provision of food and habitat for pollinators.

Require all new construction and roof replacements to implement an eco-roof.

An "eco-roof" is a term used to describe a climate-smart roof that provides multiple benefits. Eco-roofs can generate renewable energy, manage stormwater, reduce heating loads in a building, and/or mitigate urban heat island effect, depending on the type of roof installed.

- Establish an eco-roof requirement for new construction and roof replacements to ensure developers make use of frequently underutilized rooftop space to advance net zero goals and co-benefits.
- Allow for flexibility within the requirement by allowing developers and building owners to select the best option for each building and location. For instance, the requirement could be fulfilled by either a roof with solar PV or solar thermal, a blue roof that helps to manage stormwater, a green or living roof that uses green infrastructure to store water, reduce heat, and improve air quality, or a white roof that has a finishing surface that reflects sunlight to reduce temperature.
- Consider limiting or prioritizing the types of eco-roof options to those most advantageous to the building types and goals within your community. Different roofs may be more applicable in different municipalities depending on the location of lots available for new construction, or the needs of the community. For example, a more densely populated area may have more need for measures that reduce heat.

Equity Considerations

Some of the options for eco-roofs provide multiple benefits to a greater area than their lot. For example, blue roofs can make an impact over an area larger than the rooftop by reducing stormwater runoff. Energy generation from solar PV could be offered as community shared solar. When planning for the particular eco-roof types available for compliance, municipalities should survey the populations most affected for feedback. Additionally, municipalities should consider providing financial incentives to support deployment in low- and moderate-income neighborhoods.

Immediate Next Step

Municipalities can get started by assessing the solar potential, stormwater mitigation needs, and impacts of urban heat island effect in different areas of the community to determine which eco-roof types may be more feasible and useful. Municipalities should consider supporting this action by adding prioritized rooftops to the Definitions section of their zoning code (see **Action B**); this can help encourage eco-roof deployment even before requirements are in place.

Types of Eco-Roofs

Type	Definitions	Benefits
Solar Roof	A solar roof could be a solar photovoltaic (PV) system for renewable energy generation or a solar thermal 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.	• Generates renewable energy - either electricity via solar PV or thermal energy in terms of solar hot water. • Reduces energy costs to occupants over time.
Green (or Living) Roof	A roof with living green infrastructure for the purpose of mitigating heat, storing water, and improving air quality; can also function as a location for urban farming, pollinators, and passive recreation.	• Provides many co-benefits including water filtration, improved air quality, localized cooling, and reduced heating and cooling loads. • Can serve as a public amenity, providing open space.
White (or Cool) Roof	A finishing or surface that reflects more light than it absorbs. This lowers the temperature of the air around it, helping to reduce urban heat island impacts by as much as a third globally if all roofs in major cities were treated.[47]	• Low-cost option that reduces energy load in the summer, thereby also decreasing need for mechanical cooling. • May be paired with other eco-roofs or solar roof.
Blue Roof	A roof system employed in stormwater management. This could encompass active or passive rainwater storage and drainage systems.	• Improves water quality by reducing strain on sewer system and overflow events. • Reduces flooding.

Timeframe to Implement
Short-term
(Less than one year)

Urgency
By 2025

Feasibility
Local and national examples – Somerville, MA – 2019 Zoning Ordinance[48] ; Seattle, WA – Green Factor Standard[49]

Type
Policy

Lead Implementer
Select Board / City Council

Key Partners
Planning Department, Energy Manager, Zoning Board, Planning Board, Inspectional Services Department

Action H:

Adopt a Green Code with resiliency and mitigation incentives. Set minimum requirements for compliance in each zone.

Performance Indicators
- Number of permits meeting the Green Score criteria

Scale of Impact
Hard to measure/ high impact

Type of Expense
Staff time

Benefits and Impacts
Health – Improved management of urban heat island impacts
Environmental – Improved management of stormwater and outdoor air quality

Adopt a Green Code with resiliency and mitigation incentives.

A Green Code provides development incentives to encourage a variety of environmentally sustainable building and site measures. Many nature-based or green strategies also present opportunities for emissions reductions if implemented holistically. For example, a green roof improves air quality and localized cooling benefits, but it also has the mitigation benefit of reduced heating and cooling load in the building. A Green Code allows for multiple pathways of compliance, as applicants choose actions from a pre-set list (examples include native plants, de-paving, and percent lot coverage), and encourages the inclusion of green infrastructure within each lot on a points-based system. The Green Code builds off impervious surface requirements from low-impact development and adds guidance for green infrastructure.

- Assess whether a Green Code is a good fit for your community. Municipalities experiencing new development and redevelopment may want to incentivize green infrastructure that increases multiple co-benefits, including improvements to air quality, water quality, and natural cooling.
- Include incentives in the Green Code for climate mitigation measures that are implemented along with the climate resiliency measures. Such as shade trees that are planted intentionally to shade structures and reduce heating/cooling loads in nearby buildings.
- Ensure that the Green Code aligns with your community's values so that the actions worth the most points are those from which the community would most benefit, as opposed to just the most difficult to implement. This can include prioritizing trees near walking paths and sidewalks, and green infrastructure for stormwater management.

Equity Considerations

Depending on where the Green Code is implemented, there could be concern around "green gentrification," such as in the potential for displacement of residents in neighborhoods experiencing increased investment in local amenities. A zoning ordinance could be paired with housing strategies, such as community land trusts and mechanisms for preserving and requiring affordability, to address this concern. Engage residents from at-risk communities in the planning and development of the Green Code to improve the likelihood for a more equitable and impactful outcome. The specific factors and multiplier should be determined based on local needs and priorities.

Immediate Next Step

Municipalities can start by reviewing the existing examples of Green Codes (see Somerville, MA, Green Score, and Seattle, WA, Green Factors, local zoning ordinances), and conducting stakeholder engagement sessions to determine which factors should be weighted most heavily for your community.

Action I:

Require energy efficiency licensing for rental units. Include requirements for ongoing compliance.

Type
Policy

Timeframe
Intermediate
(1 to 5 years)

Urgency
By 2040

Feasibility
Leadership opportunity – look to Somerville, MA[50]; Boulder, CO[51]; NYSERDA Energy Efficiency Retrofit Program[52]

Scale of Impact
Hard to measure/high impact

Performance Indicators
- Percentage of rental units licensed
- Number of energy efficiency measures installed in licensed units

Lead Implementer
Inspectional Services Department

Key Partners
Housing Department, Energy Manager, Renters, Property Owners, Advocacy and Consumer Protection Organizations, Board of Health

Type of Expense
Staff time and operations (could be offset by noncompliance fees)

Benefits and Impacts
Equity – Increased affordability, safety, and comfort of rental units
Economic – Reduced energy costs for renters
Health – Improved resiliency and indoor air quality

Require energy efficiency licensing for rental units.

One of the largest barriers to implementation of energy efficiency in rental units is that it requires those who own and manage the property, such as landlords and building managers, to invest in efficiency upgrades while those occupying the building units – assuming they are responsible for the utility payments – experience the benefits, including economic, quality of life, resilience, and health benefits. This is known as a "split incentive." Rental licensing helps to address this challenge and promote energy efficiency in existing buildings by requiring that certain actions, such as energy audits and weatherization, be implemented in rental properties and pass a regular inspection during the point of leasing.

- Establish requirements within the rental licensing process for landlords and building managers to improve the health, safety, and welfare of renters. This could include requirements to provide a minimum level of energy efficiency for lighting, heating and cooling, and hot water their units.
- Formalize the timeline of energy efficiency measures so that landlords and building managers can implement appropriate measures strategically. Consider starting with a voluntary program with recognition for joining the program, and ramping up to required rental licensing over time.
- Provide landlords with flexibility in how to comply, such as the ability to choose which technology, from among a prioritized list or degree of efficiency, is most appropriate.
- Inspections of rental units should happen at minimum when the lease changes. However, municipalities could require more regular inspections at a standard interval of time. Results of the inspection should be publicly available for renters.
- Consider adopting commercial property assessed clean energy (PACE) financing in your community or other financing policies to help to defray the costs for licensees (see **Action I** of the Net Zero Buildings Chapter).

Equity Considerations

This action should be paired with protection for renters so that they are not displaced by resulting improvements to the property. Municipalities enacting this action should enact complementary policies and programs, such as renter protections, free renter legal aid, and renter support phone-lines. One of the primary goals of this policy should be to implement energy efficiency measures, such as clean heating and cooling technologies, and weatherization in units occupied by those often underserved by these benefits, including low- and moderate-income residents and small businesses, environmental justice communities, and those with limited English proficiency. Renters across these communities have long been a priority of the MA Energy Efficiency Advisory Council due to the challenges of the split incentive issue and significant intersection of renters with other prioritized groups.[53]

Immediate Next Step

Municipalities can start by establishing a list of rental units and a contact list of landlords within the municipality for communication about the licensing policy under development. Municipalities should also survey renters and obtain feedback on beneficial protections.

Timeframe to Implement
Ongoing

Urgency
By 2030

Feasibility
Leadership opportunity – look to Newton, MA, Climate Action Plan[54] and Zoning Redesign process[55]

Lead Implementer
Special Permit Granting Authority

Key Partners
Energy Manager, Select Board or City Council, Zoning Board, Planning Department, Inspectional Services Department

Type
Program

Action J:

Incentivize clean heating and cooling technology by including provisions for special permits. Include both residential and commercial buildings.

Performance Indicators
- Number of permits for clean heating and cooling technologies
- Number of clean heating and cooling systems installed
- Number of BTUs of clean heating and cooling installed

Type of Expense
Staff time and operations (in many cases offset by permitting fees)

Scale of Impact
Hard to measure/high impact

Benefits and Impacts
Economic – Reduced monthly energy bills for the owner or tenant
Health – Increased indoor air quality

Incentivize clean heating and cooling technology by including provisions for special permits.

Developers must seek special permits to build specific types of uses in specific zones, such as density bonus or allowing a mixed-use multifamily in a commercial district. Municipalities have the authority to incentivize the inclusion of additional amenities in order to be able to grant a special permit that align with their goals. Amenities such as solar energy systems or clean heating and cooling technologies(ground-source or air-source heat pumps or solar hot water), could be required for developers applying for a special permit.

- Create guidance for the Special Permit Granting Authority (SPGA)[56] on clean heating and cooling technologies amenities and ensure that information on the technologies is provided during special permit hearings. Once familiarity with the technology is increased, adoption of clean heating and cooling can be required as part of the special permitting process.
- Phase in the requirement of clean heating and cooling technology within the special permitting process by end use. For instance, a municipality could first require this technology to be used for space heating and cooling, and soon after include incentives for domestic hot water in single-family and then multi-family buildings.

Equity Considerations:

To ensure that low-income residents, communities of color, and other populations that are disproportionately affected by poor indoor and outdoor air quality are beneficiaries of this action, municipalities can consider equity indicators in the permitting process, prioritize permitting for multi-family buildings, or provide financial or technical assistance for those populations adopting clean heating and cooling technology.

Immediate Next Step:

Municipalities can start by reviewing their current special permit review process. The incentives for clean heating and cooling can be modeled after existing solar energy system incentives for special permits or density bonuses. Municipalities can also begin educating the select board, city council, zoning board, planning board, board of appeals, or other individuals that are a part of the SPGA on the pathway under development and the benefits and feasibility of clean heating and cooling.

Explore MAPC's resources on clean heating and cooling technologies:
https://www.mapc.org/resource-library/clean-heating-and-cooling/

Strategy:

Streamline and expedite permitting for net zero buildings.

Action K
pg 47

Action L
pg 50

Action K:

Offer expedited permitting and reduced permitting fees for net zero emissions buildings and net zero enabling technologies.

Type
Policy

Timeframe to Implement
Ongoing

Urgency
By 2030

Feasibility
Local and national examples – Natick, MA – Solar Permitting Checklist[58]; Seattle, WA - Priority Green Expedited[59]; Salt Lake City, UT - Green Building Expedited[60]; San Diego, CA - Green Building Program[61]; Palo Alto, CA – Net Zero Baseline Study[62]

Type of Expense
Staff time and operations

Performance Indicators
- Number of permits for net zero enabling technologies
- Number of permits for net zero emissions buildings
- Average length of permitting process for net zero emissions buildings and enabling technologies

Key Partners
Energy Manager, Planning Department, Zoning Board,

Scale of Impact
Hard to measure/high impact

Lead Implementer
Inspectional Services Department

Benefits and Impacts
Energy – Reduced energy use in building stock from the development of energy efficient and net zero emissions buildings
Economic – Reduced energy costs for the owner or tenant, reduced soft costs for the developer (i.e., non-hardware costs)
Health – Improved indoor air quality

Offer expedited permitting and reduced permitting fees for net zero buildings and technology.

The goal of this streamlined permitting pathway is to encourage net zero construction and technologies by providing a transparent, easier, and/or less expensive permitting process. Building developers will find a simple pathway easier to plan for and follow, and will be more likely to submit plans that meet the requirements of the pathway. Reduced or eliminated fees and more predictable timing can also be an enticement.

- Assess the existing permitting pathway for net zero buildings and enabling technologies and then implement measures to streamline the process. A checklist that outlines the permitting pathway is a beneficial starting place, as it improves communication among inspectional services, planning, and zoning staff as well as those pulling the permits. Other measures include electronic permitting, fast response times for pulled permits, automatic approvals for commonplace and prioritized technologies, brief and predictable inspection windows, and virtual inspection options.
- Provide additional substantive guidance to developers on permitting for net zero buildings. This guidance will help encourage developers to meet and exceed building standards for net zero.
- Consider combining with online plan reviews to increase the effectiveness of the process for developers.
- Offer expedited permitting and reduced permitting fees for other high-performance building types as well, perhaps with a sliding scale toward those that are more efficient and low-carbon. Include buildings meeting the requirements of Passive House and/or buildings meeting one of many high-performance building standards (see **Action E**).

Equity Considerations

In developing streamlined permitting processes, municipalities can start by prioritizing feedback from developers that are minority and women-led businesses. These steps will help to ensure that minority and women-led businesses will be able to effectively navigate the permitting pathways. Municipalities should consider increasing the available incentives for multi-family buildings and retrofits to encourage greater adoption of net zero enabling technologies and systems in hard-to-reach buildings. Moreover, they should consider implementing incentives for projects that serve environmental justice communities or share energy savings between renters and landlords in addition to these other permitting mechanisms.

Immediate Next Step

Municipalities should convene relevant staff, including Inspectional Services, Planning, and Zoning, to review the existing permitting pathways for high-performance buildings and net zero enabling building systems (such as clean heating and cooling equipment), and determine how the process can be improved for net zero-related permits. Municipalities can create a checklist of this improved process for clarity and simplicity.

Explore the resources available from MAPC and SolSmart on how to expedite permitting:
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https://www.mapc.org/wp-content/uploads/2017/11/Solar-Permitting-and-Zoning-Bylaws.pdf
https:/solsmart.org/permitting/

Action L:

Train reviewers and staff on net zero building standards and design.

Type
Program

Timeframe to Implement
Ongoing

Urgency
By 2030

Feasibility
Local examples – MAPC SolSmart Solar Permitting Trainings[63]; MassCEC Solar Permitting and Inspection Trainings[64]; Building Operator Certification trainings[65]

Lead Implementer
Inspectional Services Department

Key Partners
Certified Trainers, Planning Department, Energy Manager

Type of Expense
Capital and staff time

Performance Indicators
- Participation by Inspectional Services staff in training
- Turnaround time for permits for net zero enabling technology and net zero buildings

Benefits and Impacts
Energy – Reduced energy use in building stock from the development of new energy efficient and net zero buildings
Economic – Reduced operational energy costs
Health – Improved indoor air quality

Scale of Impact
Enabling action

Train reviewers and staff on net zero building standards and design.

Since the development of a net zero building utilizes different building standards, calculations, and codes than are typically used in construction, building inspectors and plan reviewers may not have a familiarity with best practices.

- Train planning board, building inspectors, and related staff in net zero building standards to familiarize them with high-performance building practices, to empower them to conduct relevant energy and performance calculations during plan review, and to enable inspectors to identify common construction mistakes and code violations so that they can conduct effective inspections.
- Provide a thorough curriculum that covers topics such as LEED, Net Zero, Passive House and other high-performance standards, HERS ratings, life safety benefits of high-performance buildings, and energy modeling.
- Provide continuing education units for the trainings to enhance professional development.

Equity Considerations

Training for plan reviewers and inspectors should include multi-family units, as appropriate depending on the community. There are some existing examples of net zero and net positive multi-family buildings primarily where housing is built by a state or municipality. However, significant barriers exist for renters due to the split incentive issue referenced in **Action I**. By focusing on multi-family buildings, a municipality can make this permitting pathway easier and more familiar for both the plan reviewer and the developer, which can reduce time and effort and increase the likelihood that multi-family net zero buildings will be developed.

Immediate Next Step

Municipalities should seek to establish goals for a net zero inspection and plan review training curriculum and identify project partners to conduct the trainings. Municipalities can look to MassCEC[66], Mass Save[67], and Built Environment Plus[68] for more resources on trainings.

End Notes

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