

## Update Zoning and New Development Standards for Low-Carbon Resilience



PENOBSCOT  
CLIMATE ACTION



**HIGH POTENTIAL**  
to achieve greenhouse gas  
emissions reductions



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

Municipalities in the Penobscot Climate Action region can update zoning and land use ordinances and adopt new development standards to ensure that new construction in the region supports low-carbon resilience goals. In particular, communities can focus on three main areas:

**1) Higher performance buildings** – This area includes adopting building standards or providing building incentives to achieve higher energy efficiency and lower carbon building design. As a starting point, municipalities will want to adopt the highest performance Maine Uniform Building Energy Code and/or optional Stretch Code available, and continue to update as new statewide codes are released. Municipalities may additionally set performance requirements that go beyond state codes (such as meeting Passive House standards) for certain building types, such as for municipal buildings, buildings above a specific square footage, or development projects with public funding. Higher performance building standards can also include requirements or incentives for making buildings “solar ready” or “EV ready” (e.g. wiring a home to facilitate the installation of rooftop solar or EV chargers in the future). Policies to support lower carbon new development may also include encouraging, incentivizing, and/or eventually requiring the use of materials with low embodied carbon; the prioritization of building and material reuse over new construction; and requirements that existing buildings are deconstructed rather than demolished so that materials can be reused or recycled as much as possible.

### 2) Flood resilience zoning and design standards

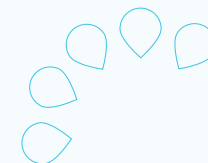
– This area includes updating land use ordinances to reflect future floodplains (based on climate modeling rather than historical storm events), and updating permitted building uses and building design standards for buildings in flood risk zones. Updated building design standards may include elevating first floors (higher **freeboard** requirements), protecting or elevating critical systems (such as electrical equipment), and/or floodproofing first floors, for example. For particularly high risk zones, it may include prohibiting specific building types or new construction in those areas altogether. Flood resilience zoning should also consider ways to enable greater density, housing diversity, affordable housing and supportive housing specifically in areas with low flood risk to shift development away from flood risk areas.

**3) Site design standards for resilience** – This area includes adopting or incentivizing stormwater management and low impact development standards to infiltrate and store stormwater on-site, as well as landscaping and site design standards for heat mitigation and ecosystem health. Considerations may include minimizing impervious surfaces, increasing stormwater retention through nature-based solutions, integrating green roofs, using “cool materials” for paving and rooftops that reflect rather than absorb heat from the sun, preserving existing trees, planting native and/or climate adapted plant species, establishing soil health standards for new construction, and/or integrating backup power. Municipalities may consider adopting performance-

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### How This Action Supports the Goals of Penobscot Climate Action

- ★ **Equity and Environmental Justice.** Making it increasingly feasible for affordable housing (and other community spaces) to meet high-performance and resilient building standards ensures that residents of all incomes—and particularly people who will be most affected by climate change—are able to benefit from the health, cost, and resilience benefits of energy efficient and resilient buildings.
- ★ **Environmental Health.** Higher energy efficiency and lower-carbon building design reduces greenhouse gas emissions (along with other types of air pollution), helping to slow climate change and supporting a healthier environment.
- ★ **Community Resilience.** Resilient zoning and development standards can guide development in a way that mitigates risks and potential harm from climate hazards such as flooding, storms, and extreme heat, in turn improving community resilience.
- ★ **Regional Collaboration.** This action creates the opportunity for municipalities to align on a common vision for future growth that supports a climate resilient region.



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based requirements, whereby buildings/sites are required to meet certain point thresholds, and points can be earned through achieving certain standards or incorporating certain features.

To be successful, adopting new building standards will require ensuring that energy codes are enforced (and that there are resources for enforcement). It will also require education, awareness-building, and training to support adoption of higher performance building practices and new resilience development standards. Maine recently adopted LD 1656, which allocates \$100 million to MaineHousing for the development of high performance affordable housing; municipalities will want to consider whether additional steps are needed locally (e.g., reducing development barriers) to enable development of high performance and resilient affordable housing.

#### KEY PARTNERS

- **Municipal planning departments**
- **Development and construction sector**, including local developers, contractors, builders, electricians, and others in construction trades
- **Affordable housing development partners**, including MaineHousing
- **Local and statewide organizations**, including Efficiency Maine, passivhaus Maine, and Northeast Energy Efficiency Partnerships (NEEP)
- **Academic partners**, including the Climate Change Adaptation Providers Network, University of Maine Cooperative Extension

## Steps for Implementation

### AREA 1

#### High Performance Buildings

**Launch a task force** - Launch a high-performance buildings task force to advise on the development and rollout of high performance building standards. Work with builders, contractors, developers – potentially in sub-committees – to identify opportunities and challenges, as well as needs for technical assistance.

**Outline a pathway for rolling out updated statewide building codes** - Work with the task force to outline a recommended pathway and timeline for rolling out and enforcing the updated Maine Uniform Building and Energy Code and/or adopting a new Stretch Code, if available. To the extent that there's flexibility, consider a “ramp up” period whereby the updated codes are adopted, but there is a period for training and education, before the codes go into effect.

**Outline pathways for higher building performance** - Work with the task force to outline opportunities to encourage higher performance standards for specific building types. Consider requirements that municipal buildings meet net zero energy or Passive House standards as a way to lead by example, and/or incentives or requirements for meeting Passive House, net zero energy, or an alternative standard for buildings over a particular square footage. Communities may choose to start with building incentives before phasing in requirements.

**Consider additional pathways for low embodied carbon and material reuse** - Work with the task force to outline opportunities to encourage the use of materials with low embodied carbon, the prioritization of building and material reuse, and to encourage building deconstruction

(as opposed to demolition). These features could be incorporated into a development review checklist. A number of certification systems (e.g., LEED) include credits and/or processes that could also be drawn on in developing incentives or policies. For building deconstruction policies to be successful, it will be important to support the expansion of a “reuse ecosystem” – i.e., reuse or recycling facilities and/or businesses or organizations that facilitate the exchange of building materials.

**Host community conversations** - This step can take place throughout the process. Host community conversations with community groups to discuss opportunities and challenges, and to build shared understanding about what it will take to increase building performance in ways that are equitable, feasible, and cost-effective.

**Outline pathways for code enforcement** - Outline pathways for meeting additional staff capacity and training needs for building code officers to provide technical guidance to developers working to meet the new standards and to ensure that new codes and development standards are enforced.

**Collaborate to build out training and technical assistance** - Work with building trades groups (e.g., passivhaus Maine) to provide trainings and technical assistance to builders, contractors, developers, and code enforcement professionals, and to build out new trainings as needed.

**Launch and monitor in a pilot period** - Consider rolling out the new development standards in a pilot period to assess and make revisions as necessary. Host workshops with individuals across the building and development sector throughout the rollout to assess what is working and what adjustments or additional support might be needed.

## AREA 2

### Flood Resilience Zoning and Design Standards

**Launch a task force** - Launch a resilience zoning task force to advise on the development and rollout of resilience zoning and design standards. Work with members of the building sector – potentially in sub-committees – to identify opportunities and challenges, as well as needs for technical assistance.

**Host community conversations** - This step can take place throughout the process. Host community conversations with community groups to discuss opportunities and challenges, and to build shared understanding about flood risk and what it will take to increase flood resilience in ways that are equitable, feasible, and cost-effective.

**Identify flood models and model parameters** - Work with an engineering consultant to complete flood models that incorporate the combined effects of projected sea level rise, storm surge and heavier precipitation. Identify model parameters to serve as the basis for flood risk zones (for example, Boston uses the 1% annual chance storm for 2070). Completing these models can be expensive; communities may choose to complete models for only specific areas with the highest flood risk in order to produce a flood resilience overlay district. Alternatively, municipalities could use existing data (such as FEMA flood zones and statewide sea level rise geospatial data), which would not have the level of granularity or precision for zoning policy, but could be used for discussion in development review processes. Consider creating interactive online maps for public use.

**Develop flood resilience design standards** - Develop flood resilience design standards for buildings exposed to flood risk. Communities may choose to first adopt these as recommended guidelines to be discussed as part of the

development review process. Reconcile any conflicts with existing land use codes or design standards, which may include, for example, historic preservation guidelines or building height maximums.

**Launch and monitor in a pilot period** - Consider rolling out the new development standards in a pilot period to assess and make revisions as necessary. Host workshops with individuals across the building and development sector throughout the rollout to assess what is working and what adjustments or additional support might be needed.

## AREA 3

### Site Design Standards for Resilience

**Launch a task force** - Launch a resilient design standards task force to advise on the development and rollout of site design standards. This may be the same, or a separate task force as the flood resilience task force. Work with members of the building sector – potentially in sub-committees – to identify opportunities and challenges, as well as needs for technical assistance.

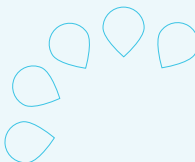
**Host community conversations** - This step can take place throughout the process. Host community conversations with community groups to discuss opportunities and challenges related to designing for heavier rain events and heat, and to build shared understanding about what it will take to create resilient neighborhoods in ways that are equitable, feasible, and cost-effective.

**Define goals for resilient neighborhoods** - Drawing from community conversations, work with the task force to prioritize goals for guiding resilient site design standards – for example, goals may include increasing stormwater infiltration, mitigating the effects of heat, supporting resilient ecosystems, enhancing soil health, or others. The most beneficial approach to achieving resilience outcomes will depend on the priorities chosen.

## Connections Across Existing Work and Other Climate Action Strategies

There are a number of efforts at the state level that support movement towards higher performance buildings. Maine will likely adopt IECC 2021 as the statewide Maine Uniform Building and Energy Code (MUBEC) in the near-term, which is estimated to increase the energy efficiency of new construction by 10% above the current base code (IECC 2015). The State also recently adopted LD 1656, which allocates \$100 million to MaineHousing for the development of high performance affordable housing. Building trades organizations, such as passivhaus Maine, currently provide a number of training programs to support builders, contractors, and developers in adopting high performance building practices, such as Passive House standards.

New resilience development standards will also build off statewide and local efforts around stormwater management. As part of the State's Municipal Separate Storm Sewer System (MS4) permitting, MS4 communities (including Bangor, Brewer, Hampden, Milford, Old Town, Orono, and Veazie in the Penobscot Climate Action Region) are required to implement updated low-impact development (LID) ordinances that will require developers to utilize LID standards in new development – such as minimizing impervious areas and using nature-based solutions to infiltrate water on-site.



**Assess current standards** - Assess current site design standards for ability to meet those goals. Identify gaps and areas for improvement.

**Assess precedents** - Assess precedents for performance design standards that can improve stormwater management, mitigate heat, and/or support ecosystem resilience in line with identified goals.

**Outline pathways for meeting resilience goals -**

Outline pathways for meeting the new site standards. Implementation approaches may include a development review checklist or a resilience score, whereby developers must meet a certain number of resilience points. Consider ways to make the new standards as simple as possible to implement and enforce, while still having a significant effect towards resilience goals.

**COST CONSIDERATIONS**

- Depending on municipal capacity, much of this toolkit will likely be completed in-house; consultant costs to support the development of zoning and design standards may range from \$20k - \$150k, depending on scope.
- It will also be important to consider costs for hiring and/or training municipal staff for code enforcement, and ways to leverage partnerships (and cost-sharing) with regional organizations to support education and training in the construction sector.

**POTENTIAL SOURCES FOR FUNDING**

- **Maine Community Action Grants** – Funding for climate mitigation and adaptation efforts, including capacity building, planning, and implementation projects.
- **IRA Funded Technical Assistance for Building Energy Codes** – Grants to states or units of local government with code making authority to adopt updated building energy codes, zero energy codes, or equivalent codes or standards.

**Launch and monitor in a pilot period** - Consider rolling out the new development standards in a pilot period to assess and make revisions as necessary. Host workshops with individuals across the building and development sector throughout the rollout to assess what is working and what adjustments or additional support might be needed.

**PRECEDENTS**

- **Adoption of IECC 2021 in Portland and South Portland** - Portland and South Portland, ME have both adopted IECC 2021, with the code going into effect in 2021 and 2022, respectively.
- **Adoption of stretch code in Massachusetts** - In January 2023, Massachusetts updated its stretch energy code to align with IECC 2021 (with Massachusetts amendments). At that point, 300 of 351 communities had already opted in to the previous stretch code showing the recognition of its importance. All communities that had adopted the previous stretch code will now automatically follow the updated stretch code, unless they opt to follow the state's more stringent "specialized stretch code."
- **ReCode Portland Resilience Zoning** - Portland, ME is currently in the process of updating its land use code to build resilience and reduce climate risk.
- **Cambridge Climate Resilience Zoning** - Cambridge, MA updated its zoning to address both flood and heat resilience. This presentation provides recommendations from the City's climate resilience task force, which were ultimately adopted by the City; specific zoning recommendations start on page 48.
- **Somerville Green Score** - Somerville, MA integrates climate resilience standards for new development into its zoning ordinances by using a "Green Score." The Green Score focuses on landscaping standards for stormwater management and heat mitigation; see page 463 for more details.
- **Norfolk's Resilience Quotient** - This article by Pew Charitable trust summarizes how Norfolk, VA adapted its zoning code to incorporate resilience.

**RESOURCES TO GET STARTED**

- **Meeting Maine's Energy Code and Retrofit Trainings** - One day, in-person trainings on understanding the new energy code, retrofits, and high performance buildings for builders, general contractors, architects, code enforcement officers, planning boards, electricians, plumbers, HVAC, enthusiasts, and more.
- **Cost-effectiveness of the 2021 IECC for Residential Buildings in Maine** - A report by Pacific Northwest National Laboratory that looks at energy savings and cost-effectiveness of adopting 2021 IECC for single-family and multi-family residential buildings in Maine.
- **City Policy Framework for Dramatically Reducing Embodied Carbon** - Precedents and case studies for municipalities working to develop embodied carbon policies, developed by the Carbon Neutral Cities Alliance, One Click LCA, and Architecture 2030.
- **One Climate Future Appendix** - Appendix C of Portland and South Portland's climate plan outlines potential approaches for resilience zoning at both city- and site-scales.
- **Southern Maine Planning and Developing Commission Coastal Resilience Resources** - SMPDC provides model ordinance language related to stormwater management and coastal resilience.
- **Guidelines on Flood Adaptation for Rehabilitating Historic Buildings** - The National Park Service provides guidelines for adapting historic buildings to flood risk.
- **American Planning Association (APA) Resources** - APA collates a wide range of resources; Check out the Climate Development Review Checklist and the Climate Ordinance Summary, in particular.
- **University of Maine Climate Change Adaptation Providers Network** - CCAP provides toolkits, resources, and data (including Maine flood risk models).

