



**PENOBSCOT**  
CLIMATE ACTION

Penobscot Climate Action  
**Executive Summary**

JANUARY 2024



Penobscot River Walkway, Bangor

## Executive Summary

**Penobscot Climate Action is a joint effort of local governments, organizations, and residents who live and work in the Greater Bangor region to advance climate goals locally and together as a region.**

In 2020, the State of Maine launched “Maine Won’t Wait,” a plan for building climate resilience across Maine and reducing greenhouse gas emissions by 45% by 2030 (from 1990 levels), and 80% by 2050. Penobscot Climate Action is a joint effort of local governments, organizations, and residents who live and work in the Greater Bangor region to advance those goals locally and together as a region. The plan outlines strategies to reduce greenhouse gas emissions, support the local economy, enhance ecosystem health, improve regional infrastructure, and create conditions for communities to respond, adapt, and thrive in the face of a changing climate.

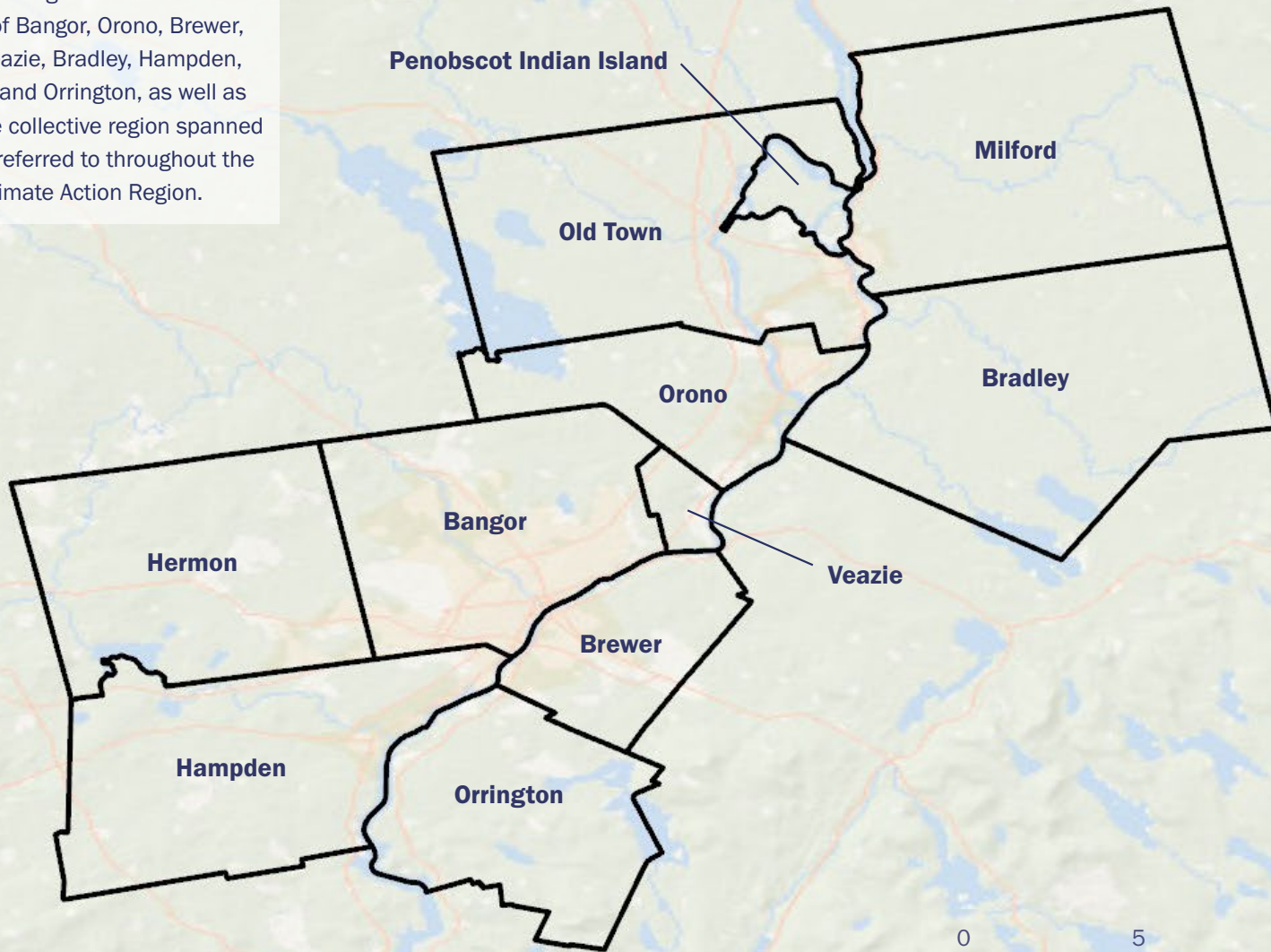
Penobscot Climate Action is data-driven and community-informed. The first phase of the project resulted in the [Climate Vulnerability Assessment](#) and [Greenhouse Gas \(GHG\)](#)





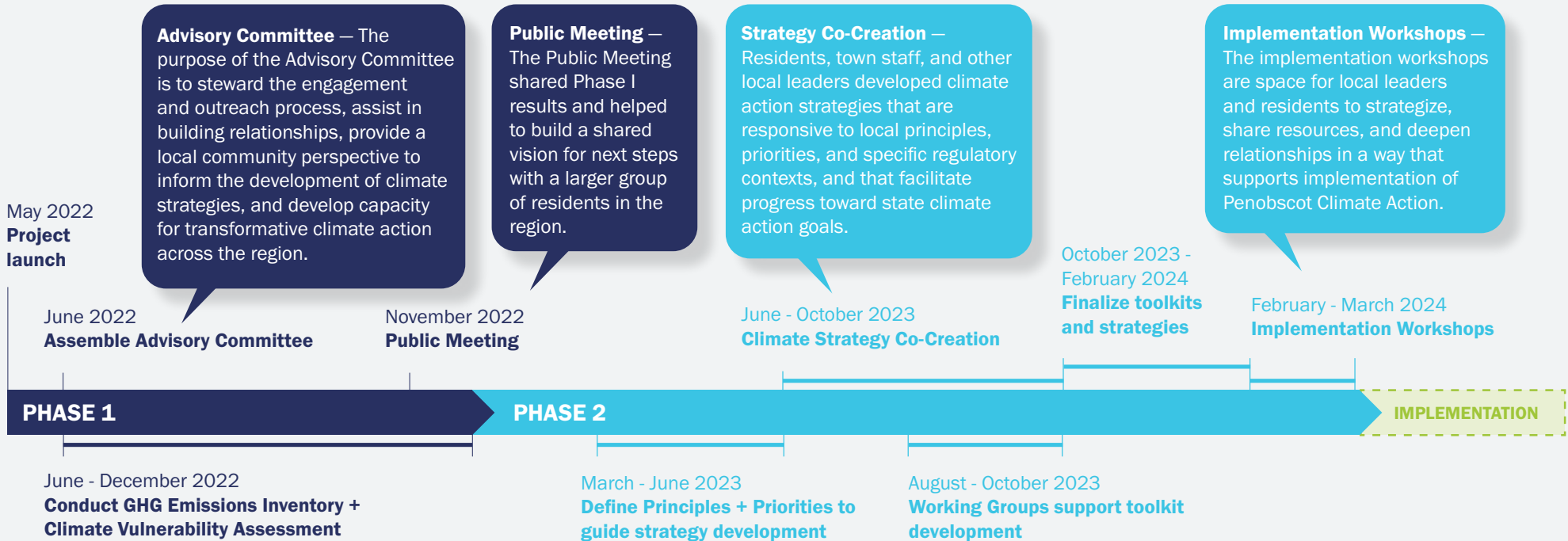
### Penobscot Climate Action Region

Penobscot Climate Action is a regional collaboration between the communities of Bangor, Orono, Brewer, Penobscot Indian Island, Veazie, Bradley, Hampden, Hermon, Milford, Old Town, and Orrington, as well as the University of Maine. The collective region spanned by these communities was referred to throughout the project as the Penobscot Climate Action Region.





## PROJECT TIMELINE



**Emissions Inventory.** Using GIS-based mapping, a review of relevant climate science and projections, and interviews with residents and town staff, the **Climate Vulnerability Assessment** and **GHG Emissions Inventory** provide a baseline assessment of current and future climate risks for the region. These data served as the foundation for decision making and action planning that took place during the second phase of the project.

Creating a healthy and vibrant future where we have the capacity to bounce back stronger after new stresses requires that all residents have equitable access to meaningful economic opportunity, resources for health and wellbeing, as well as respect and dignity. During the second phase of the project, residents, town staff, and other local leaders identified a set of principles and priority focus areas that guided the





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## PROJECT PRINCIPLES

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## PROJECT FOCUS AREAS

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development of the plan. The principles that guided the project include:

- ★ **Equity and Environmental Justice**
- ★ **Environmental Health**
- ★ **Community Resilience**
- ★ **Regional Collaboration**

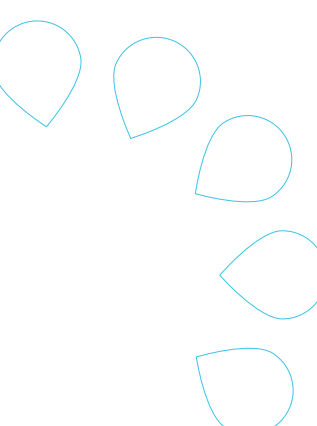
Strategies were developed to explicitly intersect with needs and goals of the following regional priority focus areas:

- ★ **Housing**
- ★ **Transportation**
- ★ **Environment and Quality of Life**
- ★ **Local Economies and Livelihoods**
- ★ **Health**

Drawing on insight from community conversations and surveys, community members and town staff then worked to identify, develop, and prioritize climate actions. This process resulted in identifying ten high-priority and high-impact strategies for the region, and developing “climate action toolkits” that package resources and information that would make it easier to put these strategies into action. See the ten climate action toolkits on the following page.

While the toolkits provide specific information and resources to kick-start implementation of ten individual high-priority, high-impact actions, the toolkits are part of a larger suite of mitigation and adaptation strategies. **Appendix A** serves as a broader list of distinct actions that can be taken independently, or in conjunction with the actions spelled out in the toolkits. Together, these documents act as a comprehensive suite of climate strategies that are meant to be easily accessible and support implementation, achieve goals identified by community members throughout the process, and facilitate progress toward climate action goals as articulated in “Maine Won’t Wait.”

You can find additional information on the community-driven solution co-creation process in **Appendix B** and the technical GHG emissions methodology in **Appendix C**.





## The Ten Penobscot Climate Action Toolkits

The toolkits include ten high-priority and high-impact strategies for the region, with resources and information to put these strategies into action.







## A Regional Approach

**Regional climate planning allows towns in the Penobscot Climate Action region to address challenges in coordination, leveraging limited financial resources and staff time while respecting the unique circumstances of individual communities.**

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### Regional Collaboration and Action

The impacts of climate change are felt across town boundaries, and holistic solutions require collaboration across jurisdictions. Regional climate action planning allows municipalities to address the impacts of a changing climate in a way that responds to regional scale-issues while respecting unique jurisdictional boundaries and leveraging limited financial resources and staff time. Proactive and well-coordinated adaptation extends beyond boundaries to efficiently share best practices, resources, and information, in a way that effectively fosters resilience across an entire region.

Penobscot Climate Action is a regional collaboration of eleven towns, led by the Bangor Area Comprehensive Transportation System (BACTS), the City of Bangor, and the Town of Orono. This plan provides a framework to strategically guide local action in a way that supports the well-being of the entire Greater Bangor region. While it is a regional plan, this comprehensive set of strategies can be tailored to meet local community needs and priorities, and to increase regional collaboration and capacity building over time.

### Actions to Get Started

The following steps are recommendations that each municipality, regardless of size, can take to get started on taking action to support Penobscot Climate Action:

- ★ **Participate in the Climate Action Committee** – Identify a municipal staff person or member of Tribal government to join the Climate Action Committee, a committee hosted by Bangor Area Comprehensive Transportation System (BACTS) focused on coordinating and overseeing the implementation of Penobscot Climate Action.
- ★ **Identify a local game plan** – Convene a group of municipal staff, members of Tribal governments, and community volunteers, to review the toolkits and **Appendix A** and to select a set of actions that are most pressing and/or feasible for the community to prioritize and implement in the next one-to-two years. Highlight “second tier” actions that the community will pursue next.
- ★ **Adopt a resolution committing to climate action** – Work with the Town Council or Tribal members to adopt a resolution that commits the community to taking climate action, in line with the recommended actions laid out in Penobscot Climate Action. The City of Bangor adopted a [Resolve](#) in 2021, which could be adapted for other communities in the region.



# Energy and Emissions Modeling

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One of the primary goals of Penobscot Climate Action is to reduce greenhouse gas emissions in the region. To analyze options toward advancing that goal, the project team developed a Community Energy and Emissions Planning (CEEP) model to inform and model strategies to reduce all quantified sources of GHG emissions in the region.

The CEEP model is built on and aligned with the 2019 GHG emissions inventory that was completed as part of Phase 1 of the project. The project team used the model to estimate future

energy and emissions under both a Business-as-Usual (BAU) scenario and a Policy Scenario which quantifies the potential impact of future actions on different sectors (e.g., buildings, transportation, waste) out to 2050. The Policy Scenario includes baseline assumptions such as population growth and new development in the region, the relevant policy actions included in the plan's toolkits and additional strategies, any relevant federal and state-wide policies such as fuel economy standards and Maine's renewable portfolio standard (RPS), and additional assumptions outside of policy (e.g., retrofit rates)

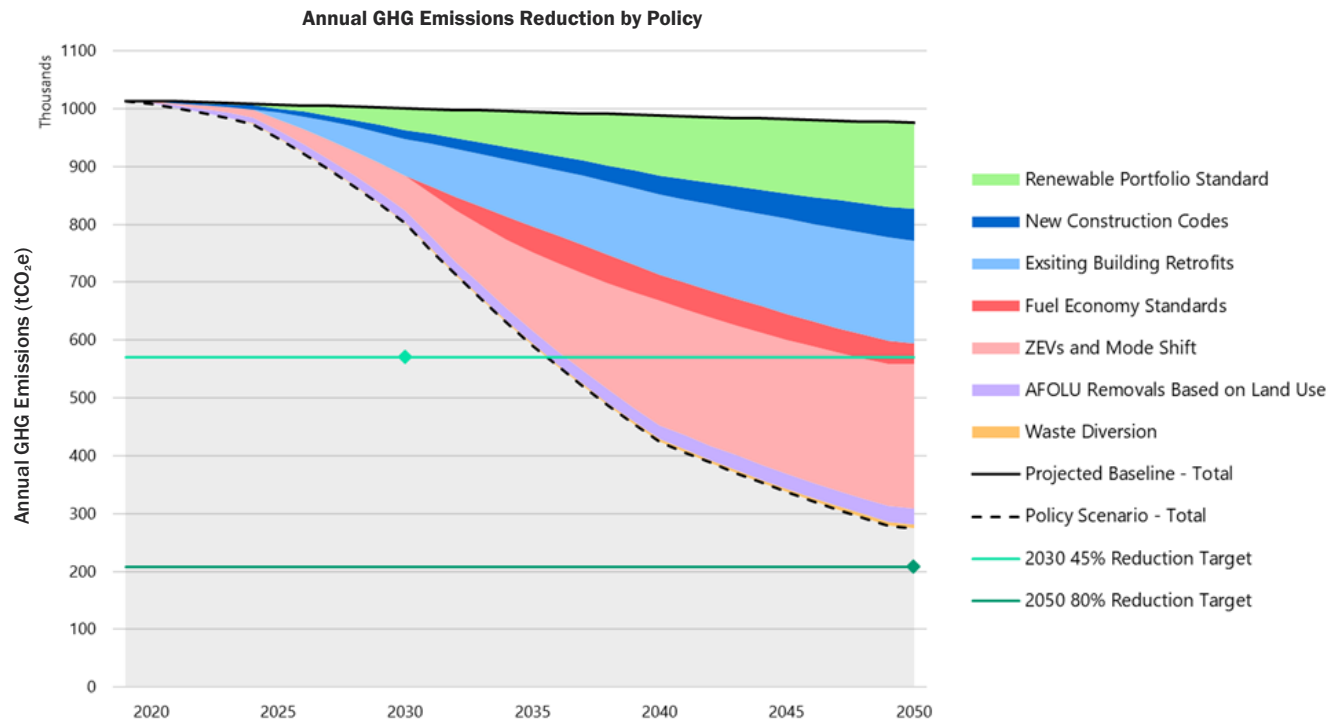


Figure 1. GHG emissions reduction in the PCA region under the Policy Scenario





that are based on best practice and are made to reflect the scale of action needed to reasonably achieve GHG reductions across sectors.

**Figure 1** demonstrates how specific policy areas, represented by the colored “wedges” in the chart, can contribute to GHG emissions reductions in the region between the 2019 baseline year and 2050. Each wedge is made up of a group of related strategies at the federal, state, and regional level, including many in the plan. For example:

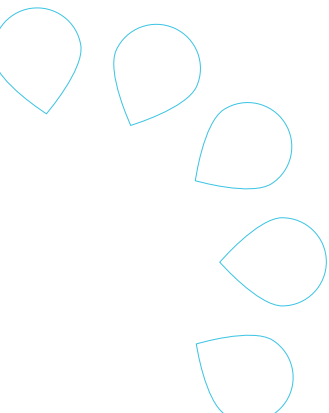
- ★ **Building and energy strategies** such as new development standards and building retrofits are reflected in the new construction codes and existing building retrofits wedges;
- ★ **Transportation system strategies** such as vehicle electrification and additional mobility options are reflected in the ZEVs (zero emissions vehicles) and mode shift wedge;
- ★ **Environment, water, and waste system strategies** such as land management practices and zero waste initiatives are reflected in the AFOLU (agriculture forestry and other land use) removals and waste diversion wedges;
- ★ **Local economies and livelihood strategies** do not directly contribute to GHG emissions reductions, but help advance many of the above policy areas.

Based on the policies and other assumptions modeled above, GHG emissions in the region are projected to decrease by about 73% by 2050 relative to the 2019 baseline. The areas with the most significant potential for GHG emissions reductions are

due to transportation policies that contribute to ZEV adoption and mode shift, existing building retrofits, and the State’s renewable portfolio standard (RPS), or greening of the grid.

While Penobscot Climate Action does not include any formal GHG emissions reductions targets, the modeling was completed in an effort to align with the 2030 and 2050 targets set in the State’s “Maine Won’t Wait” plan. As currently modeled, the region may fall short of these targets, though it should be noted that this is not a definitive analysis; many of the assumptions in the model are conservative and greater reductions may be possible with additional state and federal support. Nevertheless, more action is likely needed, particularly in the areas of existing buildings and new construction, and it is recommended that the region adopts formal GHG targets and completes further analysis as specific strategies are implemented.

The regional inventory of GHG emissions, completed during Phase I of the project, is included in the Regional Inventory of 2019 Greenhouse Gas Emissions report. A full technical methodology memo for the GHG emissions modeling is included in **Appendix C**.





# Strategies for Action

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## Buildings and Energy

Buildings are a key component of both mitigation and adaptation in the region. As identified in Phase I by the **Climate Vulnerability Assessment**, the region's critical infrastructure (such as homes, public buildings, and energy systems), and vulnerable groups (such as seniors and people with disabilities), face significant vulnerabilities related to increases in flooding, extreme weather, and extreme heat.

Over 60% of the region's GHG emissions footprint is attributable to energy use in buildings. As such, all of the strategies related to buildings and energy have some of the greatest opportunities to influence emissions reductions. Emissions in the building sector result from the burning of fossil fuels (mostly natural gas and fuel oil) and electricity use. By improving the energy efficiency of the existing building stock, supporting the transition away from fossil fuels, and expanding renewable energy generation for a cleaner electric grid, strategies related to buildings and energy use represent a critical component of climate action in the region.

In addition to significant potential for GHG emissions reductions, actions related to buildings and energy pose significant potential for community safety, health, and resilience. Access to safe housing that can withstand the impacts of extreme weather is critical for all residents of the region, especially seniors and people with disabilities, for whom access to heating in the winter, cooling in the summer, and electricity for specific devices can be life or death.



Downtown Bangor • Photo by Matthew Dewitt

Housing support and service programs for those experiencing housing insecurity also need to be reinforced so services aren't interrupted during extreme weather events. See the following toolkits, which outline steps for implementation and resources for the region to take action towards those goals:

- ★ **Toolkit #1** - Update Zoning and New Development Standards for Low-Carbon Resilience
- ★ **Toolkit #2** - Retrofit Existing Housing Stock

Beyond these key strategies, see **Appendix A** for more actions that provide additional ways communities in the Penobscot Climate Action Region can make progress towards the region's climate goals.





## Transportation Systems

Transportation systems have the potential to build community resilience by ensuring access to jobs, education, healthcare, and food. When transportation systems are interrupted by extreme weather events, residents could experience negative impacts such as lack of ability to access food, medicine, or economic opportunities. Creating a more accessible, sustainable, and resilient transportation system will make it easier for residents to get around, reduce GHG emissions and improve air quality, and make transportation infrastructure more resilient to the impacts of climate change, which also reduces the financial impact on municipalities.

Transportation is responsible for approximately one third of the region's GHG footprint. Climate action strategies geared toward transportation systems can significantly reduce GHG emissions by encouraging a shift in travel modes away from driving passenger vehicles and reducing vehicle miles traveled (VMT) in the region. The electrification of public transit and municipal fleets, along with expanded electric vehicle (EV) charging infrastructure to support the EV transition, will further reduce emissions associated with vehicles using fossil fuels.

Making it easier, safer, and more accessible to take public transportation, walk, ride a bike, or travel by other modes of active transportation was a top priority for working group members based on its ability to simultaneously support equity, climate justice, community resilience, carbon mitigation, and regional collaboration goals. See the following toolkits, which outline steps for implementation and resources for the region to take action towards those goals:



Buses stop off at the Bangor Area Transit Center • Photo by the Community Connector

- ★ **Toolkit #3** - Create a Capacity Building Strategy for Public Transit
- ★ **Toolkit #4** - Partnerships to Promote Active and Public Transit
- ★ **Toolkit #5** - Foster Complete and Walkable Neighborhoods

Beyond these key strategies, see **Appendix A** for more actions that provide additional ways communities in the Penobscot Climate Action Region can make progress towards the region's climate goals.



## Environment, Water, and Waste Systems

Data from the **Climate Vulnerability Assessment** highlight the vital role that the region's lands and natural areas play in providing flood mitigation, clean drinking water, cooling for neighborhoods in hot weather, carbon sequestration, and more. The region's forests, which comprise 50% of the region's land cover, are threatened by rising temperatures, which lead to reduced plant, tree, and animal health, and impact services like canopy cover, erosion, flooding, and biodiversity. These consequences will affect agriculture, recreation, and residents' enjoyment of outdoor benefits. Regenerating soil health, managing invasive species, and promoting biodiversity contribute to ecosystem resilience, and in turn, support community health, well-being, and the local economy. The following toolkit outlines steps for implementation, and resources for the region, to take action towards adapting land management practices that support regeneration and resilience:

★ **Toolkit #6** - Adapt Land Management and Conservation Practices to Support Resilience

Additionally, local waterways, including the Penobscot River, are crucial for the region's culture and well-being, and are facing threats like increased surface water temperatures and contamination from stormwater runoff and sewage overflows. The strategies outlined in **Appendix A** identify opportunities for storm and wastewater upgrades to address water quality and contamination. These strategies can reduce damage to critical infrastructure, and therefore, reduce financial burdens on municipalities. (Note: Maine is increasing opportunities to



Old Town Park and the Penobscot River • Photo by Matthew Dewitt

fund storm and wastewater upgrades. See [MaineDOT Municipal Stream Crossing Program](#) as an example.)

While the waste sector is only responsible for approximately 1.6% of the region's GHG footprint, the strategies in **Appendix A** still present an opportunity to reduce emissions associated with both solid waste disposal and wastewater, as well as improve ecosystem health and well-being. By supporting waste reduction and diversion from landfills, along with increased wastewater efficiency, communities can continue to advance net zero goals while ensuring that the emissions associated with waste do not increase proportionally over time.





## Local Economies and Livelihoods

The **Climate Vulnerability Assessment** found that while small businesses are a major asset to the region, and contribute to the local economy, small businesses are experiencing many pressures due to the impacts of COVID-19, inflation, and supply chain disruptions. Extreme weather and climate-related disasters will continue to strain the ability of local businesses to thrive, and could dampen the local economy. The most commercially developed area of Bangor, for example, is also one of the most vulnerable areas to flooding.

The strategies geared toward the local economy and livelihoods do not directly reduce GHG emissions in the region but do contribute to the advancement of other actions that can be highly impactful. By supporting businesses to advance their own sustainability efforts, and by growing the local workforce in the green trades, these strategies will support the uptake of energy efficiency improvements, building retrofits, and renewable energy systems in the region. See the following toolkits, which outline steps for implementation and resources for the region to take action towards those goals:

- ★ **Toolkit #7** - Develop a Climate-Ready Business Resource
- ★ **Toolkit #8** - Strengthen the Green Trades Pipeline

For more actions related to supporting small businesses and the local economy, and additional ways for communities in the Penobscot Climate Action Region can make progress towards the region's climate goals, see **Appendix A**.



Solar panel installation • Photo by Stephen Yang



## Health

Climate impacts such as extreme heat, poor water and air quality, and interruptions to transportation or energy systems, can lead to serious health risks, especially for vulnerable populations in the region. According to the **Climate Vulnerability Assessment**, seniors – who make up almost 20% of the region’s population – are exceptionally vulnerable to the impacts of climate change. Seniors are at higher risk of illness or death related to extreme temperatures, or loss of power or access to medical care caused by extreme weather events. Other vulnerable populations, such as people with disabilities, people with chronic health conditions, and people living in poverty, are also at greater risk due to challenges in accessing the healthcare they need. Making it easier to access healthcare services before and during an extreme weather event will support the overall well-being and resilience of the region. See the following toolkits, which outline steps for implementation and resources for the region to take action towards those goals:

- ★ **Toolkit #9** - Expand Community Hubs for Resilience
- ★ **Toolkit #10** - Strengthen Local and Regional Food Resilience



Photo by Anna Ackerman



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# APPENDIX A

## Additional Strategies

### BUILDINGS AND ENERGY

#### Building retrofits

*Note related to GHG emissions reductions: Building retrofits may have the greatest impact on GHG emissions in the region by directly reducing the energy use intensity of existing buildings through increased energy efficiency and the electrification of heating and cooling systems.*

**Energy audits and deep energy retrofits for municipal buildings and public schools.** Commission a strategic energy management plan (SEMP) for decarbonizing municipal building portfolios and use the SEMP to begin implementation of deep energy retrofits for municipal buildings, including beneficial electrification of building systems and improving energy. Launch a coordinated program to retrofit municipal and public school buildings, including the installation of energy efficient cooling systems. Enter into power purchase agreements to get renewable energy for facilities. Increase staff capacity for management. As an example, the Town of Orono recently completed energy audits on municipal buildings.

**Energy audits and deep energy retrofits for commercial buildings.** Launch a coordinated program to retrofit commercial buildings, including the installation of energy efficient cooling systems. Enter into power purchase agreements to get renewable energy for facilities. Increase staff capacity for management.

**Implement benchmarking and “tune-up” or performance standards.** Implement an ordinance that requires commercial and multifamily residential buildings over a particular size threshold to track and disclose energy use and greenhouse gas emissions. Tracking will help identify and prioritize larger consumers that could most benefit from energy retrofit programs. After tracking and reporting for a set period of time, benchmarked buildings would then be required to start achieving energy savings and/or greenhouse gas emissions reductions through building “tune-ups.” This may require additional staff capacity to track, and to support small landlords with necessary capital to make upgrades. This will



have significant impacts on the region’s ability to meet GHG emissions reductions goals as identified by the state.

**Implement energy efficiency standards for rental housing.** Integrate energy efficiency standards into existing rental licensing programs and/or adopt rental licensing programs that integrate energy efficiency. Municipalities would then develop a program that involves registration, inspection, and eventually pathways for retrofits for noncompliant rental units to address known health, safety, and energy efficiency issues, with a specific focus on protecting housing affordability and reducing burden on small-scale landlords. This will have significant impacts on the region’s ability to meet GHG emissions reductions goals as identified by the state.

**Create a historic preservation and resilience plan.** In addition to vulnerability assessments, cities or towns can create a historic preservation and resilience plan to target historic buildings for resiliency upgrades. See Rhode Island’s “Keeping History Above Water” initiative, as an example.

## Resilient and Renewable Energy Systems

*Note related to GHG emissions reductions: Strategies that build and strengthen resilient and renewable energy systems will contribute to emissions reductions by supporting the expansion of local solar and improving the region’s Renewable Portfolio Standard (i.e., greening of the grid).*

**Implement resilient power systems.** Conduct an assessment of potential sites for a resilient power system (i.e., solar and storage) that would provide backup power to support critical infrastructure or operations. Prioritize municipal buildings and parking lots, as well as sites that serve residents with greater vulnerability (e.g., affordable housing, nursing homes or assisted living facilities, community centers, shelters, or health clinics). Consider clustering multiple sites with a microgrid.

**Facilitate expansion of rooftop solar.** Launch a coordinated effort (marketing, education, technical assistance, program financing) to support the expansion of rooftop solar – starting with municipal buildings and parking lots – and then expanding to homes, multifamily housing, commercial and industrial buildings. Procure grant funding to assess suitable buildings, hire “solar ambassadors” to lead targeted outreach, and work with a solar developer to facilitate solar installations.

**Update zoning to expand renewable energy infrastructure while protecting critical ecosystems and wildlife habitat.** Update zoning to enable construction or expansion of renewable energy infrastructure. Implement ordinances that ensure solar installation is prioritized on already developed land, such as rooftops, parking lots, brownfields, or landfills; that low-impact development practices are used when considering citing infrastructure in forested/agricultural land or in significant wildlife habitat; and that incentivize solar ready new construction. Consider bulk purchasing programs to support expansion of renewable energy infrastructure.

**Facilitate expansion of community renewable energy systems.** Explore sites, ownership, and financing options for a community solar project to expand access to solar for renters and residents without access to financial resources or a rooftop suitable for solar. This action could also involve assessing additional options for community wind.

## Access to Resilient and Affordable Housing

**Enhance community resilience through housing support programming.** Access to resilient, energy efficient, and safe housing is essential to community well-being and economic security. Housing support and service programs for those experiencing housing insecurity also needs to be reinforced so services aren’t interrupted during extreme weather events. This reinforcement could take many

forms, including implementing a “housing first approach”, using ARPA funds for eviction prevention and diversion, or implementing disaster recovery planning that leverages disaster recovery activities to further fair housing goals. This strategy would be particularly successful if approached regionally.

## TRANSPORTATION SYSTEMS

### Resilient infrastructure

**Culvert inventories.** Audit culverts impacting local roads in conjunction with BACTS conducting a culvert inventory along key corridors, to assess their condition and prioritize upgrades based on climate projections and for future capacity needs. This strategy could be combined with “Identify and Address Priority Stormwater Infrastructure Upgrades” (See section on Environment, Water, and Waste Systems) to more holistically address flooding and stormwater infrastructure upgrades.

**Build out asset management systems with climate data.** Begin logging and tracking flooding incidents, storm damage, or other climate data in asset management systems in order to collect data, predict needed upgrades, and prioritize infrastructure investments.

### Complete Streets

**Develop complete streets guidelines and model ordinance.** BACTS will develop complete street guidelines that are tailored to different size municipalities, and model ordinance language to help municipalities adopt complete street ordinances. Note that this action dovetails with many of the steps and components outlined as a part of fostering complete and walkable neighborhoods (**Toolkit #5**).

### Additional Mobility Options

**Conduct a feasibility assessment and business plan for an income-tiered EV car-share program.** An income-tiered EV car-share program could be an additional way to expand (low-carbon and low-pollution!) transportation options to people without access to a private vehicle. Such a program could be based and/or operated at a site with other services accessed by low-income families.

**Implement (or expand) electric bike-share or scooter-share program.** Old Town has had Bird Scooters since 2022, and the program has recently expanded to Orono. Expand and/or implement bike-share or scooter-share programs in other towns. Broaden access to e-bikes through programs such as credit-free payment options, rebates for residents purchasing their own e-bikes, and expanding adaptive fleets that could include recumbent bikes, cargo bikes, child-sized bikes, or other models to fit a wider range of people’s needs.

### Vehicle Electrification

***Note related to GHG emissions reductions:** Vehicle electrification is particularly impactful for reducing GHG emissions associated with on-road vehicles using gasoline and diesel by increasing the share of low- or zero-emissions vehicles being driven in the region.*

**Develop a transition plan for municipal vehicle fleets.** Develop a capital transition plan for transitioning municipal vehicles and lawn-care equipment to electric and alternative fuel vehicles. Consider using performance-based procurement for contracted vehicles (such as school buses), which would give preference to companies that use electric vehicles in their fleets.

**Expand electric vehicle charging stations in existing lots.** Build out EV charging stations in municipal lots, including lots for employees. Launch an outreach and information campaign to encourage the buildout of public charging stations in private lots. Such a campaign would share testimonials and case studies from other local businesses who have installed EV chargers, as well as information on available tax credits, rebates, and other financing mechanisms to support EV charger installation. Coordinate with state and federal partners to select locations for charging stations that align with local priorities as part of state and federal plans to expand EV charging along key corridors.

**Integrate EV charging requirements into zoning ordinances.** Update zoning ordinances to require commercial and residential new developments with off-street parking (as well as any new municipal facilities) to equip a certain percentage of parking spaces with EV charging stations and/or consider requiring that a specific percentage of spaces meet EV-ready parameters.

**Launch an initiative to encourage personal EV purchasing.** Develop and implement a community outreach plan that aims to demystify, share information on feasibility and options, and encourage residents in the Bangor region to consider an EV vehicle purchase. Promote the rebates offered through Efficiency Maine and participating dealerships and consider creating municipal incentives for installing charging systems at home. Host promotional events in collaboration with local car dealers to host an “EV showcase” that would allow residents to test drive and consider a range of EV options.

## ENVIRONMENT, WATER, AND WASTE SYSTEMS

### Waste Systems

**Advance research, education, and advocacy for long-term regional approaches to waste.** The waste landscape in the Penobscot Climate Action region has undergone many changes in recent years. Launch an effort to take a holistic approach to research and evaluation of potential options; education to increase transparency and communication around waste; and advocacy towards a suite of regional approaches for diverting waste from landfills, minimizing pollution and leaching of toxic chemicals, cultivating economic opportunities, and creating value from waste.

**Promote zero-waste business initiatives.** Launch an outreach campaign that connects with local businesses to provide information, resources, and technical assistance for identifying ways to reduce waste, reuse materials, source recycled or compostable products (such as packaging and serviceware), or offer low- or zero-waste product options. Pair this campaign with small grants for businesses to embark on zero-waste efforts, and/or marketing to champion local success stories and to celebrate work businesses are doing to reduce waste. Note State of Maine’s Extended Producer Responsibility Bill for Packaging.

**Implement composting drop-off programs.** Facilitate commercial and residential composting through drop-off programs for food waste, leaf and yard waste. Food or yard waste can be turned into compost and provided to community gardens, small farms, and residents for free. Augusta’s leaf and yard waste composting initiative can be used as an example.

### Water Systems

**Update stormwater design standards and ordinances.** Update or adopt municipal stormwater infrastructure design standards that account for local climate projections for higher intensity storm events. Update municipal stormwater regulations to include low impact development standards, which would encourage new development to achieve higher rates of stormwater retention,

infiltration, evapotranspiration, and groundwater recharge on site through green infrastructure systems and to incentivize smaller areas of impervious surfaces.

**Identify and address priority stormwater infrastructure upgrades based on climate risk and climate justice.** Conduct hydrodynamic / hydrologic modeling under future climate scenarios in specific areas to understand the extent of flooding from overwhelmed drainage systems in increasingly heavy storm events. Use this information, in conjunction with local knowledge of areas that already experience frequent flooding, to prioritize upgrades to stormwater systems in capital improvement plans. Of those sites, prioritize locations that affect communities that are already disproportionately affected by climate change. Work with impacted community groups to assess a suite of sites suitable for green infrastructure installation and depaving projects to minimize the impact on the (gray) stormwater system.

**Evaluate the feasibility of a stormwater utility.** Conduct a feasibility study for establishing a stormwater utility modeled after the stormwater utility implemented by Bangor in 2012.

**Participate in FEMA's community rating system.** The Community Rating System is a voluntary program under the National Flood Insurance Program. When participating communities implement specific flood protection activities, residents within those communities receive discounts on flood insurance premiums.

## LOCAL ECONOMIES AND LIVELIHOODS

### Climate-Ready Businesses

**Create a green/resilience business passport incentive program.** Design a passport initiative program to engage both businesses and customers in educational and engaging and awareness of green, sustainable, and resilience actions taken by local businesses. Example incentives include offering a 10% discount on purchases, offering stickers for filling in passports, and receiving a prize for filling out a full passport. This program is intended to promote environmentally responsible practices among businesses while encouraging individuals to make responsible consumer choices in their community.

### Workforce Development

**Create pipelines for municipal positions (especially that support climate goals).** Bangor created a free commercial drivers license (CDL) training program that then connected students in the program with bus driver and plow driver positions in the city. This action could involve collaborating with education / adult education and career development partners to build out similar programs, specifically for municipal positions that support the region's climate goals. For example, efforts to decarbonize and increase the energy efficiency of municipal buildings will create a greater need for qualified facilities managers. This action could focus on working with career development partners to develop a local facilities management training program with a focus on energy efficiency and building decarbonization (e.g., Building Operators Certification), including a focus on advancement opportunities for incumbent maintenance staff. Check out the Public Administration courses at UMaine Augusta's Early College Program for an example of partnerships with local education institutions developing a pipeline of municipal employees.

**Create youth summer employment opportunities.** Collaborate with organizations supporting youth workforce development to build out a youth employment program that connects youth and young



adults with summer job opportunities in municipal government and regional organizations. Consider ways that the program could facilitate job opportunities by providing subsidized wages for youth that work with selected employers, and by supporting youth with job readiness training and other resources. These positions could align with climate goals, such as “tree ambassador” programs for watering new trees and monitoring for pests. Check out the United Technologies Center and UME Forestry for examples of formal internship programs that connect students with local municipal and private employers.

**Expand workforce opportunities through broadband expansion.** Much of the BACTS region (Hermon, Hampton, Orrington, Brewer, Orono, Old Town, Penobscot Indian Nation Island, Milford, Bradley) is underserved in terms of broadband access. A number of initiatives and partnerships (e.g., OTO Fiber in Orono and Old Town, Milford’s participation in a regional Get Ready: Community Support Program grant from the Maine Connectivity Authority, etc.) are working to combat that challenge. Target specific next steps to closing gaps in the region.

## HEALTH

### Food Systems

**Expand urban farms, food forests, and community gardens.** Remove any barriers for small-scale agriculture and associated structures in urbanized areas through zoning upgrades; identify municipal-owned properties that could be converted to public food forests or community gardens; enable lease-agreements for the use of municipal-owned land for food growing operations; and explore tax or other incentives for buildings or sites that explore innovative features that support health and climate goals (e.g., co-locating rooftop community garden and community rooftop solar)



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# APPENDIX B

## Community Process Memo

Penobscot Climate Action is data-driven and community-informed. This memo serves to summarize how community input was collected and incorporated throughout the project.

Penobscot Climate Action unfolded in two phases, beginning in May 2022, and ending in March 2024:

### Phase I

#### Climate Vulnerability Assessment (CVA) and Greenhouse Gas (GHG) Emissions Inventory

Using GIS-based mapping, a review of relevant climate science and projections, and interviews with residents and town staff, the CVA and GHG emissions inventory provide a baseline assessment of current and future climate risks for the region. These data served as the foundation for decision making and action planning that took place during the second phase of the project.

Phase I was led by two stakeholder groups:

- 1) **The Project Team**, composed of BACTS, Bangor and Orono town staff, and consultants from BSC Group, Introba, and Linnean oversaw the conceptualization and implementation of all phases of the project;
- 2) **The Advisory Committee**, composed of over 20 individuals representing town staff, community-based organizations, Penobscot Tribal membership, and youth, steered the engagement and outreach process throughout the project, and provided a local community perspective to inform the overall development of Penobscot Climate Action.

During Phase II, the Project Team, with the help of the Advisory Committee, also convened several Working Groups to inform the production of the toolkits. Working Groups were composed of town staff, residents, and advocates. Working Groups are discussed in more detail in the section on Phase II below.

## Phase II

### Community-Driven Climate Action Planning and Strategy Development

To solicit broad community feedback that directly informed the development of the Penobscot Climate Action strategies, Phase II rolled out in three stages:

- 1) **Principles and Priorities Development Stage:** Generated project principles and priorities, and developed accountability measures that ensured that the Project Team upheld their commitment to the principles, priorities, and community-led approach.
- 2) **Solution Co-Creation Stage:** Co-created strategies that were directly informed by the community's principles and priorities, guided by Maine Won't Wait and other regional plans, and supplemented with technical expertise from BSC Group, Linnean, and Introba. Working Groups identified ten strategies with high near-term impact to develop into toolkits. Toolkits provide additional specific information and resources that identify opportunities for, and reduce barriers to, strategy implementation.
- 3) **Implementation Workshops Stage:** Hosted workshops to support the implementation of the toolkits and identify opportunities to enhance the usability of the final toolkits for key stakeholders.

During the "Principles and Priorities Development Stage," the Project Team administered digital surveys, attended community events, and organized small group meetings to engage residents, town staff, and other local leaders. Through these engagement activities, the Project Team and Advisory Committee developed a set of principles that guided the development of the plan. The principles that guided the project include:

- **Equity and Environmental Justice**
- **Environmental Health**
- **Community Resilience**
- **Regional Collaboration**

The engagement activities also highlighted five issue areas of high priority to residents of the region. Strategies were developed to explicitly intersect with the following priority areas:

- **Housing**
- **Transportation**
- **Environment and Quality of Life**
- **Local Economies and Livelihoods**
- **Health**

#### A note about surveys:

Surveys were circulated using physical flyers in public spaces such as libraries, coffee shops, and other communal venues. Additionally, distribution occurred at local events, complemented by online distribution on city websites, news articles, social media platforms, and email lists.

The first survey, conducted from April to June 2023, generated just over 300 participants. Responses helped build the Project Team's understanding of climate action priorities and preferences throughout the Penobscot Climate Action region. Additionally, the survey directly facilitated the identification and recruitment of residents within the Penobscot Climate Action region who expressed interest in participating in subsequent stages in the process, including working groups, the second survey, and implementation workshops.

Starting in June 2023, the second survey generated 265 responses, and indicated that there was widespread support for the strategies that were further developed during the “Solution Co-creation Stage.” These findings guided Working Group discussions and supported the toolkits. Notably, the results exposed a gap between the perceived community prioritization of strategies and individuals’ willingness to actively engage in related actions. This highlights the importance of providing and communicating accessible pathways for individuals in the region to engage with the strategy implementation.

During the “Solution Co-creation Stage,” the Project Team administered digital surveys, attended community events, and organized small group meetings to engage additional residents, town staff, and other local leaders. Through these engagement activities, the Project Team identified a wide range of climate action strategies that set a vision for regional action through: 1) facilitating progress toward state climate action goals; 2) addressing the principles and priorities as defined by community members through the “Principles and Priorities Development Stage”; and 3) fitting into the specific regulatory contexts of the 11 towns in the region.

From that list of strategies, Working Group members met three times from August through October to identify ten strategies to be developed into implementation toolkits. Working Groups were composed of residents, town staff, and local leaders with expertise or interest in each topic, to ensure that the toolkits were grounded in the lived experiences of residents in the region. The toolkits were chosen for their potential for impact, relative level of importance to community members, time-sensitivity, and relative complexity for implementation (i.e., involve a number of partners, steps, or phases to implement), thereby benefiting most from a toolkit to support implementation.

The community process concluded with two implementation workshops to support staff and key stakeholders from the 11 towns in the project region to engage with the recommendations of Penobscot Climate Action. The workshops provided space for town staff and key stakeholders to strategize, share resources, and deepen supportive relationships toward shared goals.





**PENOBSCOT**  
CLIMATE ACTION

# **APPENDIX C**

## Community Energy and Emissions Modeling Technical Methodology

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# 1.0 Model Overview

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One of the primary goals of Penobscot Climate Action is to reduce greenhouse gas (GHG) emissions in the Bangor Area Comprehensive Transportation System (BACTS) metropolitan planning area (the “region”). To analyze options toward advancing that goal, Introba (formerly Integral Group) developed a Community Energy and Emissions Planning (CEEP) model to inform and model strategies to reduce all quantified sources of GHG emissions in the region. The region includes eleven communities: Bangor, Bradley, Brewer, Hampden, Hermon, Milford, Old Town, Orono (including the University of Maine campus), Orrington, Penobscot Indian Island, and Veazie.

The CEEP model is built on and aligned with the Regional Inventory of 2019 Greenhouse Gas Emissions, which Introba completed as part of Phase 1 of the project. The CEEP model is used to estimate future energy and emissions under both a Business-as-Usual (BAU) Scenario and a Policy Scenario which quantifies the potential impact of future actions on different sectors (e.g., buildings, transportation, waste) out to 2050. The BAU Scenario includes baseline assumptions such as population growth and new development in the region, but no other policy actions. The Policy Scenario includes the same baseline assumptions as well as the relevant policy actions included in the plan’s toolkits and additional strategies, any relevant federal and state-wide policies such as fuel economy standards and Maine’s renewable portfolio standard, and additional assumptions outside of policy (e.g., existing building retrofit rates) that are based on best practice and are made to reflect the scale of action needed to reasonably achieve GHG reductions in certain sectors.

It is important to note that although no formal GHG emissions reduction targets were adopted as part of the Penobscot Climate Action project, the Policy Scenario does take into account targets set by the State of Maine in its “Maine Won’t Wait” climate action plan.<sup>1</sup> These targets include a 45% reduction in GHG emissions by 2030 and an 80% reduction by 2050 from 1990 levels. In this case, targets are shown relative to the model base year, 2019, in line with the region’s baseline GHG inventory.

The model is not intended to be a predictive tool and does not account for costs or externalities other than GHG emissions. The model is intended to provide communities with a high-level understanding of how they can achieve GHG reductions, and therefore, only explores policies and actions where GHG savings are quantifiable. GHG savings in some sectors are more directly quantifiable and are based on the specific requirements of applicable policies (e.g., the building sector and new construction codes) whereas GHG savings in other sectors where actions are more difficult to tie to specific savings, are based on the scale of action required to achieve significant but achievable GHG reductions. In these cases, the assessment looks to achieving specific sectoral targets based on feasible levels of market transformation. It must be noted that GHG reductions are not a given with Penobscot Climate Action; the specific design and implementation of many of the plan’s recommended actions will take further analysis, including cost-effectiveness and feasibility.

This technical methodology is divided into five major sections: **Energy Supply, Buildings, Transportation, Waste, and Agriculture, Forestry and Other Land Use**. For each sector, the BAU assumptions are discussed first, and then the Policy Scenario assumptions. The GHG savings for each policy modeled are included on a final wedge chart (see section 7.0 Results). Where multiple

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<sup>1</sup> Maine Climate Council (2020), Maine Won’t Wait. [maine.gov/climateplan/](https://maine.gov/climateplan/)



policies target the same emissions source, savings are grouped under one wedge. Table 1 shows the primary source from where specific policies or model inputs are derived, the wedge on the final chart (Figure 1) where GHG savings are depicted, and the corresponding section of this report.

<b>Policy/Input</b>	<b>Primary Source: PCA Section or Other</b>	<b>Wedge</b>	<b>Technical Methodology Section</b>
Renewable Portfolio Standard	Maine Won't Wait	Renewable Portfolio Standard	2.2.1
Energy Benchmarking	PCA: Buildings and Energy	Existing Building Retrofits	3.2.1
Existing Building Decarbonization	PCA: Buildings and Energy	Existing Building Retrofits	3.2.2
Residential Building Retrofits	PCA: Toolkit 2 (Retrofit Existing Housing Stock)	Existing Building Retrofits	3.2.3
Commercial, Institutional, & Industrial Building Retrofits	PCA: Buildings and Energy	Existing Building Retrofits	3.2.4
Step Codes for New Construction, Redevelopment, and Major Renovations	PCA: Toolkit 1 (New Development Standards)	New Construction Codes	3.3.1
Electric Vehicle Adoption	PCA: Transportation Systems	ZEVs and Mode Shift	4.2.1
Mode Shift	PCA: Transportation Systems, Toolkits 3-5	ZEVs and Mode Shift	4.2.2
Fuel Economy Standards	Federal CAFE and HDPUV Standards	Fuel Economy Standards	4.2.3
Waste Diversion	PCA: Environment, Water, & Waste Systems	Waste Diversion	5.2.1
Land Use Changes	PCA: Toolkit 6 (Land Management Practices)	AFOLU Removals Based on Land Use	6.2.1

## 2.0 Energy Supply

The model quantifies GHG emissions from all sectors from 2019 through 2050, accounting for all energy use, energy sources, and emissions factors. The BAU Scenario assumes that the 2019 baseline emissions factors all stay constant. The modeled Policy Scenario then assesses the GHG emissions avoided through 2050 considering the implementation of the state's renewable portfolio standard.

### 2.1 BAU GHG Emissions Intensities

The model applies GHG emissions intensity factors (measured in tCO<sub>2</sub>e/kWh) to annual energy use by fuel type (measured in kWh/year) to calculate the total annual GHG emissions by fuel type (measured in tCO<sub>2</sub>e/year). These GHG emissions factors are the same as those used in the 2019 baseline GHG inventory.

The emission factor for electricity is taken from the Northeast Power Coordinating Council (NPCC) New England sub-region factor from EPA’s eGrid<sup>2</sup> database of regional GHG intensities for 2019, which aligns with the ISO New England region. The emissions factors for natural gas, fuel oil, gasoline, and diesel are all taken from the EPA’s Emission Factors List<sup>3</sup> for 2018. While the emissions factor for electricity may fluctuate over time, the emissions factors for fossil fuels are a function of their carbon content and are relatively constant over time. Under the model’s BAU Scenario, the GHG intensities of all energy types were kept constant between 2019 and 2050.

<b>Fuel Type</b>	<b>Emission Factor (tCO<sub>2</sub>e/kBtu)</b>	<b>Emission Factor (tCO<sub>2</sub>e/kWh)</b>	<b>Modeled Trajectory</b>
Electricity	6.51E-05	2.22E-04	BAU – constant over time Policy Scenario – declines due to RPS
Natural Gas	5.31E-05	1.81E-04	BAU & Policy Scenarios – constant over time
Fuel Oil	7.44E-05	2.54E-04	
Gasoline	7.22E-05	2.46E-04	
Diesel	7.41E-05	2.53E-04	

## 2.2 Avoided Energy Supply Sector Emissions Under Policy Scenario

### 2.2.1 Renewable Portfolio Standard

Renewable electricity currently supplies 11% of electricity in the ISO New England region.<sup>4</sup> Maine’s new renewable energy portfolio standard (RPS) calls for 80% of electricity supply to come from renewable sources by 2030, and 100% of the electricity supply to come from renewable power by 2050. To determine the impact of the RPS, the Policy Scenario likewise increases the renewable portion of electricity to 80% by 2030 and to 100% by 2050. These percentages increase linearly between the target years assuming a gradual change to the electricity supply.

<b>Year</b>	<b>% Renewable</b>	<b>Emission Factor (tCO<sub>2</sub>e/kWh)</b>
2019	11%	2.22E-04
2030	80%	4.44E-05
2050	100%	2.22E-06

<sup>2</sup> US EPA, Emissions & Generation Resource Integrated Database (eGrid). <https://www.epa.gov/egridd>

<sup>3</sup> US EPA, GHG Emission Factors Hub. <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

<sup>4</sup> ISO New England, New England Power Grid 2022-2023 Profile. [https://www.iso-ne.com/static-assets/documents/2021/03/new\\_england\\_power\\_grid\\_regional\\_profile.pdf](https://www.iso-ne.com/static-assets/documents/2021/03/new_england_power_grid_regional_profile.pdf)

The GHG savings associated with the state’s RPS show up in the **Renewable Portfolio Standard** wedge on the final chart (Figure 1). Related strategies that help support the RPS and statewide renewable energy are included in the Resilient and Renewable Energy Systems section of the plan.

## 3.0 Buildings

The model quantifies GHG emissions for all buildings in the region between 2019 and 2050, accounting for all energy use by buildings. The BAU Scenario assumes the energy use intensity (EUI) for each building type remains constant, while accounting for projected building growth in the region. The Policy Scenario then assesses the GHG emissions avoided through 2050 if the region were to implement a set of policy scenarios that focus on building energy efficiency and decarbonization.

### 3.1 BAU Building Assumptions

To address growth in the building sector, the model incorporates the region’s projected population growth rate and employment rate. Net growth for residential building types is set equal to the average percent change in population among all towns in the region, using population projection data provided by BACTS. Net growth for all commercial, institutional, and industrial building types is based on the average employment growth rate among all towns in the region, using employment projection data provided by BACTS. Table 4 includes the average annual growth rate (AAGR) for each building type included in the baseline GHG inventory.

<b>Building Type</b>	<b>Baseline Floor Area (Sq Ft)</b>	<b>AAGR (%)</b>
<b>Residential</b>		
Single Family	30,351,006	-0.224%
Multifamily (2+ units)	8,078,950	-0.224%
<b>Commercial, Institutional, and Industrial</b>		
Government	475,200	0.448%
Education	237,600	0.448%
Commercial	27,269,404	0.448%
Healthcare	2,394,000	0.448%
Industrial	1,724,295	0.448%

The energy use intensity (EUI) for each building type can be determined by the total amount of energy a building uses per year divided by total building area. However, to allocate a specific energy

consumption to the various building types in the baseline GHG inventory and in the model, Introba developed a set of preliminary EUIs based on EIA’s nationwide building energy surveys. The EUIs for residential building types were developed from the 2018 Residential Energy Consumption Survey (RECS)<sup>5</sup> data for ASHRAE Climate Zone 6A, while the EUIs for institutional and commercial building types were developed from the 2018 Commercial Building Energy Consumption Survey (CBECS)<sup>6</sup> data for the New England region (Table 5).

<b>Building Type</b>	<b>Total Site EUI (kBtu/sq ft)</b>	<b>Electricity EUI (kBtu/sq ft)</b>	<b>Natural Gas EUI (kBtu/sq ft)</b>	<b>Fuel Oil EUI (kBtu/sq ft)</b>
<b>Residential</b>				
Single Family	117.0	18.2	16.09	82.7
Multifamily (2+ units)	89.0	18.2	36.4	34.4
<b>Commercial, Institutional, and Industrial</b>				
Government	89.1	29.5	44.1	15.5
Education	134.2	20.3	68.2	45.7
Commercial	118.4	36.2	74.2	8.0
Healthcare	240.9	51.6	146.7	42.7
Industrial	814.7	259.8	554.9	0.0

## 3.2 Avoided Building Sector Emissions Under Policy Scenario – Existing Buildings

### 3.2.1 Energy Benchmarking

The Policy Scenario includes projected effects if the region were to adopt a regional benchmarking program and “tune-up” performance standards. The program is assumed to apply to multifamily residential buildings and commercial, institutional, and industrial buildings over 20,000 square feet in size, which is a common threshold used in benchmarking programs.

Benchmarking is assumed to be implemented in the region starting in 2028 (in four years). Based on a survey of results from other cities, an 80% compliance rate is assumed and applied to the percent of floor area for each building type that is over the 20,000 square foot size threshold. Due to limited access to assessor’s data for building floor area across the region, The Policy Scenario assumes that 20% of multifamily residential building floor area and 80% of commercial, institutional, and industrial building floor area is over the 20,000 square foot threshold.

Energy benchmarking is modeled as a percentage reduction in energy use across all fuel types. In this case, a 7% reduction in energy use is applied based on an IMT survey.<sup>7</sup> The annual penetration (i.e.,

<sup>5</sup> US Energy Information Administration, 2018 RECS Survey Data.

<https://www.eia.gov/consumption/residential/>

<sup>6</sup> US Energy Information Administration, 2018 CBECS Survey Data.

<https://www.eia.gov/consumption/commercial/>

<sup>7</sup> Institute for Market Transformation (2015), The Benefits of Benchmarking Building Performance.

[https://www.imt.org/wp-content/uploads/2018/02/PCC\\_Benefits\\_of\\_Benchmarking.pdf](https://www.imt.org/wp-content/uploads/2018/02/PCC_Benefits_of_Benchmarking.pdf)



the percent of building floor area affected) is assumed to be 3% for multifamily residential buildings and 10% for commercial, institutional, and industrial buildings. It is assumed that it takes five years to reach maximum compliance and that energy savings are seen over three years from when a building first reports. For simplicity, The Policy Scenario averages energy savings over a duration of eight years. The energy use reduction due to benchmarking does not include any energy savings associated with fuel switching (see section 3.2.2 below).

The GHG savings associated with energy benchmarking show up in the **Existing Building Retrofits** wedge on the final chart (Figure 1). Related strategies that help support energy benchmarking are included in the Buildings and Energy section of the plan.

### 3.2.2 Existing Building Decarbonization

Given the prevalent use of natural gas and fuel oil heating in Maine, the region will not be able to achieve significant GHG reductions in line with state targets without switching most existing buildings to carbon-neutral sources of heating, such as high-efficiency, cold-climate air-source heat pumps or ground-source heat pumps. While incentives exist, there is no current policy that directly pushes for fuel switching (i.e., electrification) in the region. The Policy Scenario therefore assumes that 75% of all residential, institutional, and commercial buildings that use natural gas or fuel oil are electrified by 2050 – a rate of over 3% per year based on best practice and roughly in line with an equipment replacement lifetime of 30 years – starting in 2025.

The Policy Scenario makes the following assumptions for system efficiencies (Table 6). The fuel switch factors are the amount of additional electricity required to make up for the removed natural gas or fuel oil. For example, a natural gas fuel switch factor of 0.426 for single family homes means that for every unit of natural gas consumption removed, 0.426 units of electricity consumption will be added. In this example, a building that used to use 5,000 kBtu of electricity and 10,000 kBtu of natural gas, after fuel switching, will use 9,260 kBtu of electricity and 0 kBtu of natural gas. These factors are a function of relative efficiency assumptions and the distribution of fuel use in each building type.

<b>Building Type</b>	<b>Efficiency Factor – NG to Electricity</b>	<b>Efficiency Factor – FO to Electricity</b>
<b>Residential</b>		
Single Family	0.426	0.484
Multifamily (2+ units)	0.460	0.362
<b>Commercial, Institutional, and Industrial</b>		
Government	0.497	0.413
Education	0.470	0.426
Commercial	0.421	0.362
Healthcare	0.830	0.600
Industrial	0.846	0.603

The GHG savings associated with existing building decarbonization show up in the **Existing Building Retrofits** wedge on the final chart (Figure 1). Related strategies that help support existing building decarbonization are included in the Buildings and Energy section of the plan.

### 3.2.3 Residential Building Retrofits

The modeled retrofits include a variety of building interventions focused on reducing energy and/or emissions apart from fuel switching, ranging from lighting upgrades to insulation, weatherization, and full envelope upgrades. Similar to existing building electrification, although incentives exist, there is no current policy that directly pushes for efficiency retrofits in the region. The retrofit rates assumed in the Policy Scenario are intended to provide a sense of the scale of action required in the existing building sector to achieve GHG reductions in line with state targets, while being realistic enough to implement through the regional adoption of a retrofit strategy.

The scale of retrofits assumed for residential buildings is equivalent to achieving 40-50% energy use reduction across 1.5% of the existing floor area each year (Table 7). Average energy use reduction increases from the near-term (2025 – 2030) to the long-term (2031 – 2050) as programs and technology are expected to improve. The Policy Scenario applies these energy reductions equally across all fuel types. In practice, retrofits are likely to be carried out through a lower average energy use reduction across a larger portion of the existing housing stock.

The GHG savings associated with residential building retrofits show up in the **Existing Building Retrofits** wedge on the final chart (Figure 1). Related strategies that help support residential building retrofits are primarily included in Toolkit 2: Retrofit Existing Housing Stock.

### 3.2.4 Commercial, Institutional, and Industrial Building Retrofits

The scale of retrofits assumed for commercial, institutional, and industrial buildings will range from achieving 30%-80% energy use reduction across 2%-3% of the existing floor area depending on building type (Table 7). Average energy use reduction increases from the near-term (2025 – 2030) to the long-term (2031 – 2050) as programs and technology are expected to improve. As with residential building retrofits, these rates are not based on actual policy, but intended to provide a sense of scale to support state GHG targets while also aligning with national and global best practices.

<b>Table 7. Retrofit Assumptions</b>			
<b>Building Type</b>	<b>Years</b>	<b>% EUI Reduction</b>	<b>Penetration Rate Per Year</b>
<b>Residential</b>			
Single Family	2025 – 2030	40%	1.5%
Single Family	2031 – 2050	50%	1.5%
Multifamily (2+ units)	2025 – 2030	40%	1.5%
Multifamily (2+ units)	2031 – 2050	50%	1.5%
<b>Commercial, Institutional, and Industrial</b>			
Government	2025 – 2030	30%	3%

<b>Building Type</b>	<b>Years</b>	<b>% EUI Reduction</b>	<b>Penetration Rate Per Year</b>
Government	2031 – 2050	80%	3%
Education	2025 – 2030	30%	3%
Education	2031 – 2050	80%	3%
Commercial	2025 – 2030	40%	2%
Commercial	2031 – 2050	50%	2%
Healthcare	2025 – 2030	40%	2%
Healthcare	2031 – 2050	50%	2%
Industrial	2025 – 2030	40%	2%
Industrial	2031 – 2050	50%	2%

The GHG savings associated with commercial, institutional, and industrial building retrofits show up in the **Existing Building Retrofits** wedge on the final chart (Figure 1). Related strategies that help support existing building retrofits are included in the Buildings and Energy section of the plan.

### 3.3 Avoided Building Sector Emissions Under Policy Scenario – New Construction

#### 3.3.1 Step Codes for New Construction, Redevelopment, and Major Renovations

To project rates of new construction, redevelopment, and major renovations in the region, the Policy Scenario assumes net growth rates in the building sector based on population and employment projections for the region. This results in an average growth rate of -0.2% across all residential buildings, to match the projected population decline through 2050, and an average growth rate of 0.4% across commercial, institutional, and industrial building types to match employment projections through 2050. The Policy Scenario also assumes that 1% of the existing floor area for each building type will undergo redevelopment or major renovations each year, which will be subject to new construction codes. The amount of redeveloped floor area is assumed to be equal to the existing floor area it replaces.

The baseline energy code for the region is IECC 2015. EUIs for each building type by fuel source under IECC 2015 are derived from PNNL prototype building models (Table 8), except for industrial buildings where the EUI is kept consistent with that of existing industrial buildings. This is due to the lack of available energy modeling for industrial buildings and the fact that industrial EUIs are largely driven by process loads. Industrial buildings also only account for a small percentage of the overall new floor area. EUIs for fuel oil are not included below given the lack of available modeling and the small percentage of new floor space tied to fuel oil use.

<b>Building Type</b>	<b>EUI – Electricity (kWh/m<sup>2</sup>)</b>	<b>EUI – Natural Gas (kWh/m<sup>2</sup>)</b>	<b>EUI – Total (kWh/m<sup>2</sup>)</b>
<b>Residential</b>			
Single Family	51.2	167.5	218.8
Multifamily (2+ units)	94.8	102.5	197.3
<b>Commercial, Institutional, and Industrial</b>			
Government	110.8	30.1	140.9
Education	109.6	73.1	182.7
Commercial	116.3	104.6	220.9
Healthcare	228.7	160.8	389.5
Industrial	819.7	1,750.6	2,570.2

The Policy Scenario then phases in more energy efficient building codes applied to new construction, redevelopment, and major renovations in line with statewide targets. First, the Policy Scenario assumes adoption of IECC 2021 as the statewide Maine Uniform Building and Energy Code (MUBEC) in 2025, which is estimated to have a 10% EUI reduction compared to the current base code (IECC 2015). The Policy Scenario then assumes the statewide adoption of a net zero stretch code in 2035 as outlined in the Maine Won't Wait plan. The net zero stretch code is estimated to have 30% EUI reduction compared to IECC 2015 and 100% reduction in natural gas and fuel oil use. Lastly, the Policy Scenario assumes a standard lag time between permitting and building, equaling a two-year delay for single-family homes and a three-year delay for all other building types. This means that the modeled EUI improvements do not impact new floor space in the region until 2-3 years after the targeted code updates (e.g., a 10% EUI reduction is applied to single-family homes starting in 2027, two years after the MUBEC adoption of IECC 2021).

An overview of anticipated energy code updates is as follows:

1. **IECC 2015** – baseline energy code through 2025
2. **IECC 2021** – adopted in 2025, includes a 10% EUI reduction over IECC 2015
3. **Net Zero Stretch Code** – adopted in 2035, includes a 30% EUI reduction over IECC 2015 and 100% reduction in fossil fuel use

The GHG savings associated with step codes for new construction, redevelopment, and major renovations show up in the **New Construction Codes** wedge on the final chart (Figure 1). Related strategies that help support new construction codes are included in Toolkit 1: Update Zoning and New Development Standards for Low-Carbon Resilience.

## 4.0 Transportation

The model quantifies GHG emissions for all on-road transportation in the region between 2019 and 2050. The BAU Scenario assumes that vehicle miles traveled continues to increase at historical rates, with the current levels of vehicle fuel economy. The Policy Scenario then assesses the GHG



emissions avoided through 2050 if the region were to implement a set of transportation and land use policies that encourage vehicle electrification and mode shift. The vehicle types in the model were selected to align with those used in the 2019 GHG inventory.

### 4.1 BAU Transportation Assumptions

Baseline transportation emissions for vehicles were based on the vehicle miles traveled (VMT), fuel efficiency, and the GHG intensities of fuel sources by vehicle type, including light duty vehicles (LDV), light duty trucks (LDT), heavy duty vehicles (HDV), and buses (Table 9). The VMT for each of these broad vehicle types is aggregated and rounded from the more granular data included in the 2019 GHG inventory.

Vehicle Type	Fuel Type	Baseline VMT (miles)	BAU Fuel Efficiency (kBtu/mile)	BAU Fuel GHG Intensity (tCO2e/kBtu)
LDV	Gasoline	181,088,000	3.80	7.22E-05
LDV	Electric	1,686,000	1.08	6.51E-05
LDT	Gasoline	397,967,000	7.27	7.22E-05
LDT	Diesel	10,584,000	8.02	7.41E-05
LDT	Electric	96,000	1.08	6.51E-05
HDV	Diesel	27,947,000	26.04	7.41E-05
HDV	Gasoline	11,190,000	23.58	7.22E-05
HDV	Electric	0	1.08	6.51E-05
Bus	Diesel	3,766,000	41.82	7.41E-05
Bus	Electric	0	1.08	6.51E-05

Mode share numbers are aggregated for the 11 communities in the region based on 2017-2021 American Community Survey mode split data provided by BACTS (Table 10). Because these mode share numbers come from commute data, they likely inflate the use of transit, walking, and biking, relative to all travel, but better data for all passenger trips was not available. Heavy duty vehicles are not included in the mode share numbers.

Mode	Baseline Mode Share (%)
Passenger Vehicle	84.2%
Public Transit	1.1%
Walking, Biking, or Other	14.6%

### 4.2 Avoided Transportation Sector Emissions Under Policy Scenario

### 4.2.1 Electric Vehicle Adoption

The Policy Scenario assumes a 7% vehicle turnover rate, meaning that on average, a vehicle is replaced every 15 years. The Policy Scenario also assumes that the share of new vehicles sold that are zero emission vehicles (ZEV) will increase over time in line with state targets (Table 10).

The proportion of new light duty vehicles and trucks that are ZEVs will increase from 43% in 2028 to 82% in 2032, and reach 100% in 2035, based on targets in Maine’s Clean Transportation Roadmap.<sup>8</sup> The proportion of heavy duty vehicles that are ZEVs will also increase over time, maxing out at 75% between 2035 and 2050 depending on their size, based on targets in Maine’s Clean Transportation Roadmap.

Lastly, the Policy Scenario assumes a target of zero-emissions bus fleet by 2040 if the region were to adopt a regional bus electrification strategy. As buses have an average 15-year lifespan, all new bus purchases must therefore be electric starting in 2025, with the proportion increasing linearly as diesel buses are retired. This assumption goes beyond any current, smaller-scale programs such as the Community Connector’s electrification plan.<sup>9</sup>

<b>Vehicle Type</b>	<b>ZEV Sales Target 1 (%)</b>	<b>Target Year 1</b>	<b>ZEV Sales Target 2 (%)</b>	<b>Target Year 2</b>	<b>ZEV Sales Target 3 (%)</b>	<b>Target Year 3</b>
LDV	43%	2028	82%	2032	100%	2035
LDT	43%	2028	82%	2032	100%	2035
HDV	75%	2035	NA	NA	NA	NA
HDV – Large Diesel	75%	2050	NA	NA	NA	NA
Bus	100%	2025	NA	NA	NA	NA

The GHG savings associated with electric vehicle adoption show up in the **ZEVs and Mode Shift** wedge on the final chart (Figure 1). Related strategies that help support electric vehicle adoption are included in the Transportation Systems section of the plan.

### 4.2.2 Mode Shift

Land use policies and strategies to increase active and public transit are crucial to reducing GHG emissions by encouraging a shift in travel modes away from passenger vehicles. However, modeling the effects of a variety of individual policies on mode shift and VMT is extremely complex. Given this constraint, the Policy Scenario calculates GHG reductions based on the VMT changes that result from reaching a set of mode share thresholds. While there are no mode shift targets proposed as part of the plan, the Policy Scenario assumes favorable mode shift in relation to current mode share

<sup>8</sup> Maine Governor’s Energy Office (2021), Maine Clean Transportation Roadmap. <https://www.maine.gov/future/initiatives/climate/cleantransportation>

<sup>9</sup> Bus Electrification Transition Plan for Bangor Community Connector. (2023). <https://www1.maine.gov/mdot/climate/docs/Bangor%20CC%20Electrification%20Plan%20v1.1.pdf>

in the region, increasing over time to a targeted mode share of 60% for passenger vehicles in 2050, 20% for public transit, and 20% for walking and biking (or other) based on best practices (Table 12).

<b>Mode</b>	<b>BAU Mode Share (%)</b>	<b>2050 Target Mode Share (%)</b>
Passenger Vehicle	84.2%	60%
Public Transit	1.1%	20%
Walking, Biking, or Other	14.6%	20%

The GHG savings associated with mode shift show up in the **ZEVs and Mode Shift** wedge on the final chart (Figure 1). Related strategies that help support mode shift are included in the Transportation Systems section of the plan and various toolkits including Toolkit 3: Create a Capacity Building Strategy for Public Transit; Toolkit 4: Partnerships to Promote Active and Public Transit; and Toolkit 5: Foster Complete and Walkable Neighborhoods.

### 4.2.3 Fuel Economy Standards

As existing vehicles are retired and replaced with new vehicles, the average fuel efficiency of the vehicle stock and the vehicles that comprise it change. New vehicles entering the stock have a higher fuel efficiency rating due to the federal Corporate Average Fuel Economy (CAFE) Standard.<sup>10</sup> The GHG and energy use reduction impacts of the CAFE Standard were included in the Policy Scenario – not the BAU Scenario – to make its impact on GHG emissions explicit. However, because it is a federal regulation already in place, the CAFE Standard will achieve GHG reductions regardless of actions taken in the region.

As previously stated, the Policy Scenario assumes a vehicle turnover rate of 7%. While the overall vehicle stock is becoming more efficient over time due to the CAFE Standard, the mix of vehicles in Maine is also changing as trucks and SUVs become more popular. Therefore, the Policy Scenario assumes the overall fuel economy on Maine’s roads remains unchanged through 2030 to reflect recent trends. From 2030, the Policy Scenario assumes a 2% increase in fuel economy each year for new light duty vehicles, 4% for new light duty trucks, and 10% for new heavy duty vehicles (Table 13), roughly in line with anticipated updates to the CAFE Standard. The Policy Scenario does not apply improved fuel economy standards to electric vehicles or new buses, which are assumed to switch to all electric replacements starting in 2025.

<b>Vehicle Type</b>	<b>Fuel Type</b>	<b>BAU Fuel Efficiency (kBtu/mile)</b>	<b>Annual Fuel Efficiency Improvement for New Vehicles (%)</b>
LDV	Gasoline	3.80	2%
LDV	Electric	1.08	NA

<sup>10</sup> U.S. Department of Transportation, Corporate Average Fuel Economy Standards. <https://www.transportation.gov/mission/sustainability/corporate-average-fuel-economy-cafe-standards>

**Table 13. Projected Fuel Economy Changes**

Vehicle Type	Fuel Type	BAU Fuel Efficiency (kBtu/mile)	Annual Fuel Efficiency Improvement for New Vehicles (%)
LDT	Gasoline	7.27	4%
LDT	Diesel	8.02	4%
LDT	Electric	1.08	NA
HDV	Diesel	26.04	10%
HDV	Gasoline	23.58	10%
HDV	Electric	1.08	NA
Bus	Diesel	41.82	NA
Bus	Electric	1.08	NA

The GHG savings associated with fuel economy standards show up in the **Fuel Economy Standards** wedge on the final chart (Figure 1). This is the only wedge that cannot be linked to any of the sections in the plan or its toolkits, however, it is important to include in the model as a key strategy for reducing GHG emissions from transportation.

## 5.0 Waste

The model quantifies GHG emissions from all waste in the region between 2019 and 2050. The BAU Scenario assumes a proportional change in waste emissions based on population growth in the region. The Policy Scenario then assesses the GHG emissions avoided through 2050 if the region were to implement a strategy to divert waste away from landfill.

### 5.1 BAU Waste Assumptions

Emissions associated with waste are based on the solid waste that is disposed of in landfills and is calculated using an emissions per tonne rate (0.32 tCO<sub>2</sub>e/tonne) based on the 2019 baseline GHG inventory. The emissions per tonne rate is applied to projections of landfilled waste, factoring in overall waste reduction and diversion rates. For the purpose of this model, the emissions associated with solid waste that is recycled or composted is considered negligible (0.00 tCO<sub>2</sub>e/tonne).

As addressed in the GHG inventory, all solid waste was assumed to be landfilled due to the landscape of waste collection and disposal in the region during the inventory year of 2019. Further, no waste characterization study was available for the region, so quantities of different categories of solid waste are estimated based on the 2011 Maine Residential Waste Characterization Study. For simplicity, all waste in the region is assumed to be municipal solid waste (MSW) and the tonnage per capita (0.34 tonnes) is assumed to be constant through 2050. These generalizations do not take into account smaller scale programs, including recycling and composting programs at UMaine, which have a negligible impact on the overall waste sector in the region.



Emissions associated with wastewater treatment were excluded from the model due to the complexity and absence of any applicable policies in the plan.

## 5.2 Avoided Waste Sector Emissions Under Policy Scenario

### 5.2.1 Waste Diversion

Since there are no specific waste reduction or diversion targets included in the plan or its toolkits, the Policy Scenario applies diversion rates based on widely accepted best practices and comparable community targets. A 2050 diversion target of 80% is assumed in line with conservative definitions for zero waste targets and in line with verbal plans provided by the Municipal Review Committee (MRC), the region’s primary waste management service. This means that, by 2050, 80% of the region’s municipal solid waste will be diverted from landfill (i.e., recycled, composted, or other form of emissions-free disposal). Based on conversations between Introba, BACTS, MRC, and disposal facilities in the region, there is still significant uncertainty around future waste disposal practices in the region. Given this uncertainty, the Policy Scenario assumes that diversion rates increase linearly from the baseline level (0%) to the maximum diversion rate (80%) by 2050.

<b>Municipal Solid Waste</b>	<b>2019 Baseline</b>	<b>2050 Projected</b>
Total (tonnes)	26,183	24,479
Per Capita (tonnes)	0.34	0.34
Landfilled (%)	100%	20%
Landfilled (tonnes)	26,183	4,896
Recycled (%)	0%	80%
Recycled (tonnes)	0	19,584

The GHG savings associated with waste diversion show up in the **Waste Diversion** wedge on the final chart (Figure 1). Related strategies that help support waste diversion are included in the Environment, Water, and Waste Systems section of the plan.

## 6.0 Agriculture, Forestry, and Other Land Use

The model quantifies GHG emissions for all agriculture, forestry, and other land use (AFOLU) sources in the region between 2019 and 2050. The overarching AFOLU categories incorporated in the model include emissions from livestock and land use changes – including GHG removals due to land use changes – consistent with the baseline GHG inventory. The BAU Scenario assumes that AFOLU sources and their emissions remain constant through 2050, while the Policy Scenario assesses the

GHG emissions avoided through 2050 if the region were to implement a set of improved land management practices that contribute to GHG removals (i.e., carbon sequestration).

## 6.1 BAU AFOLU Assumptions

The baseline GHG inventory accounts for both emissions (e.g., resulting from deforestation) and removals (e.g., resulting from reforestation) in the region. The total carbon sequestration of undisturbed forest in the region is reported in the inventory's methodology memo, but not included in the final regional emissions inventory in order to focus on the impact of emissions sources in the region, consistent with the Maine State Emissions Inventory. As such, the GHG removals associated with undisturbed forest are also excluded from the modeling assessment in order to keep the focus on changes to emissions sources in the region. Instead, the model calculates total emissions from the AFOLU sector based on emissions due to livestock, emissions due to land use changes, and removals due to land use changes. In the BAU Scenario, all sources of AFOLU emissions and removals are assumed to be constant over time.

Reporting the magnitude of carbon forest sequestration in the region, however, is valuable for informing future land use decisions, particularly around the conservation of forests. In fact, the total annual carbon sequestration of undisturbed forest in the region is equal to about 314,000 tCO<sub>2</sub>e, which balances out roughly 90% of the GHG emissions associated with the transportation sector, underscoring this importance of land use decisions.

## 6.2 Avoided AFOLU Sector Emissions Under Policy Scenario

### 6.2.1 Land Use Changes

Although the GHG removals associated with undisturbed forest are excluded from the analysis, the Policy Scenario does incorporate the GHG removals (i.e. carbon sequestration) associated with reforestation and urban canopy maintained/gained because these categories reflect active land use changes that impact GHG emissions flux. Although there are no specific targets included in the plan or its toolkits, the Policy Scenario assumes an increase in these two land use categories based on proposed improvements in land management practices and in alignment with statewide conservation goals.

The Policy Scenario therefore assumes an increase in land uses that sequester carbon if the region were to implement a land management strategy with targets for a 50% increase in urban tree canopy and reforestation by 2030, and a 100% increase by 2050. This would be equivalent to doubling the region's urban tree canopy by 2050. While not the same, these assumptions are roughly in line with existing conservation targets to increase the total acreage of conserved land from 20% to 30% (a 50% increase) by 2030 in line with Maine Won't Wait targets, and an increase from 20% to 40% (a 100% increase) by 2050 based on long-range global best practices. Table 15 demonstrates how a projected increase in land use categories that sequester carbon leads to a decrease in the total annual emissions in the AFOLU sector through 2050.

Other sources of AFOLU emissions (e.g., livestock) are assumed to remain constant through 2050 due to a lack of data and applicable strategies in the plan.

**Table 15. Baseline and Projected AFOLU Emissions Assumptions**

<b>Year/Target</b>	<b>Conservation Targets (% Land)</b>	<b>Projected Increase in Land Uses that Sequester Carbon (% Increase)</b>	<b>Total Emissions (tCO<sub>2</sub>e)</b>
2019 State Baseline	20%	0%	46,836
2030 State Target	30%	50%	27,171
2050 Best Practice	40%	100%	18,782

The GHG savings associated with land use changes show up in the **AFOLU Removals Based on Land Use** wedge on the final chart (Figure 1). Related strategies that help support land use changes are primarily included in Toolkit 6: Adapt Land Management Practices to Support Resilience.

## 7.0 Results

The following section summarizes the results of the model, including the effects on GHG emissions reductions driven by the implementation of policies in the Penobscot Climate Action plan, the region's future emissions breakdown by sector, the cumulative emissions reduction impact associated with each policy "wedge," and overarching recommendations for future action.

### 7.1 GHG Emissions Reductions Under Policy Scenario

Based on the policies and additional assumptions modeled, GHG emissions in the region are projected to decrease by about 73% by 2050 relative to the 2019 baseline (Figure 1). While most of these savings can be attributed to the policies and other assumptions outlined in this assessment, there is some decrease in total emissions expected under the BAU Scenario, mostly due to the projected population decline in the region.

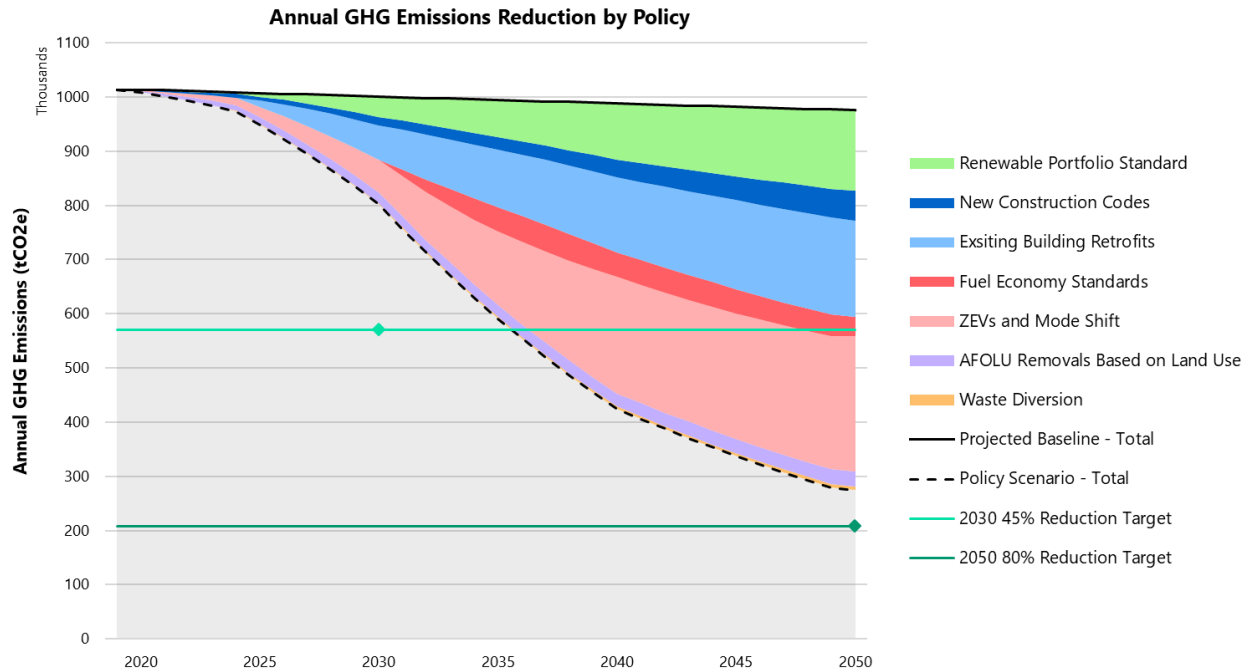


Figure 1: GHG emissions reduction in the PCA region under the Policy Scenario

Table 16 demonstrates the total emissions savings expected under the BAU and Policy Scenarios. Out of all GHG savings under the Policy Scenario, 69% can be attributed to the specific policy assumptions modeled.

<b>Regional Emissions</b>	<b>2019 (baseline)</b>	<b>2050 (modeled)</b>
Total Emissions – BAU Scenario (tCO <sub>2</sub> e)	1,013,748	975,792
Total Emissions – Policy Scenario (tCO <sub>2</sub> e)	1,013,748	274,307
Total Emissions Reduction relative to baseline under Policy Scenario (tCO <sub>2</sub> e)	0	739,441
Total Emissions Reduction relative to BAU under Policy Scenario (tCO <sub>2</sub> e)	0	701,485
Total Emissions Reduction relative to baseline under Policy Scenario (%)	0%	73%
Total Emissions Reduction relative to BAU under Policy Scenario (%)	0%	69%

To help demonstrate where these GHG savings are occurring and their significance, the chart below (Figure 2) shows the total GHG emissions breakdown by sector between the 2019 baseline year and the 2050 Policy Scenario. Note that there are no emissions associated with new construction from the 2019 baseline inventory and that the new construction emissions in the 2050 Policy Scenario represent added emissions to the building sector due to future buildings that will be built between 2019 and 2050.



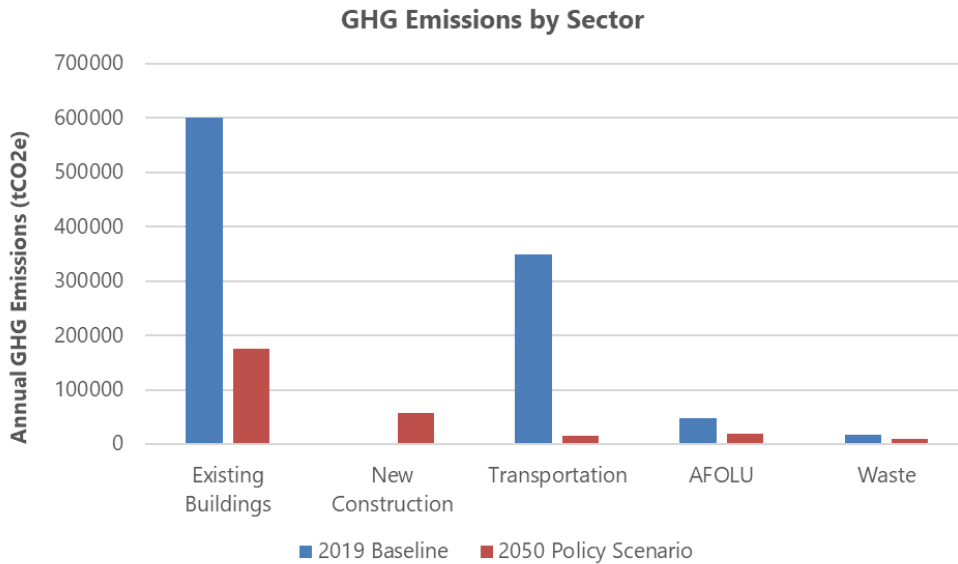


Figure 2: GHG emissions by sector between 2019 Baseline and 2050 Policy Scenario

Figure 3 is the GHG emissions breakdown (by percent of total emissions) for 2050 by sector under the modeled Policy Scenario. This shows where residual emissions are present after all modeled policies and additional assumptions are implemented, demonstrating where further action may be needed for even greater GHG savings. Note that in this figure, the total emissions from existing buildings and new construction are combined into a single building sector to better demonstrate the cumulative impact of all buildings that will exist by 2050. Under the Policy Scenario, 84% of all emissions will come from the building sector by 2050.

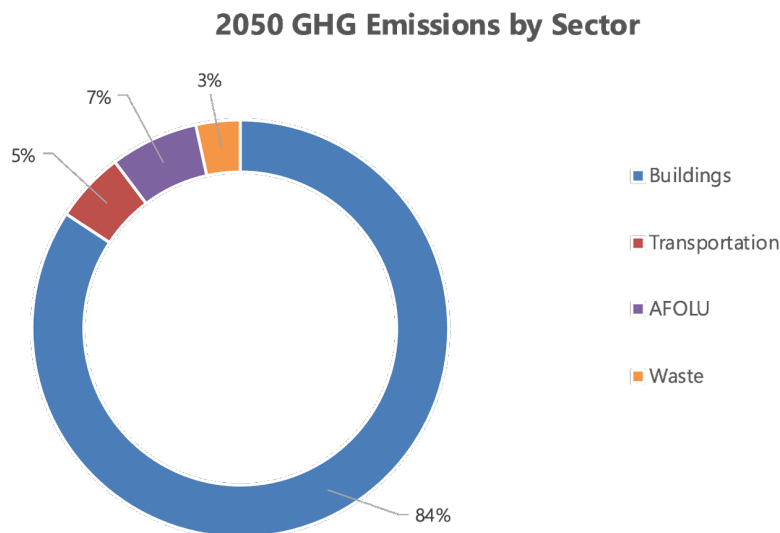


Figure 3: 2050 GHG emissions breakdown by sector under Policy Scenario

Figure 4 demonstrates the breakdown in cumulative emissions savings by policy area – or wedge corresponding to Figure 1 – among all policies and assumptions modeled in this assessment.

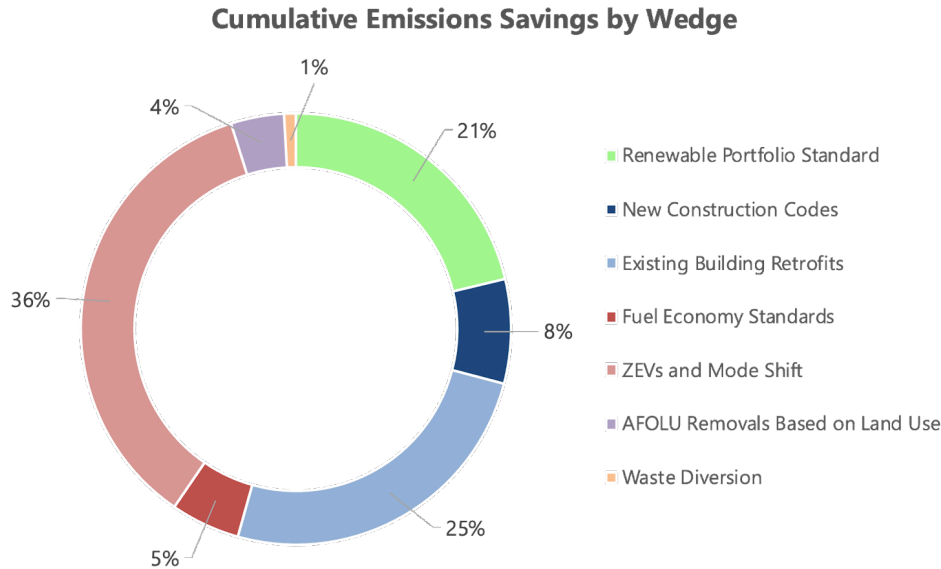


Figure 4: Cumulative emissions savings by wedge

Taking into account all GHG savings reflected in the 2050 Policy Scenario, the policy areas with the most significant potential for GHG emissions reduction include:

1. **ZEVs and Mode Shift** – 36% of all cumulative savings due to policy
2. **Existing Building Retrofits** – 25% of all cumulative savings due to policy
3. **Renewable Portfolio Standard** – 21% of all cumulative savings due to policy

Together, these three policy areas make up 82% of all cumulative savings due to policy and other assumptions in the Policy Scenario.

## 7.2 Recommendations for Future Action

As currently modeled, the region may fall short of GHG emissions reduction targets set in the state’s Maine Won’t Wait Plan, which include a 45% reduction in GHG emissions by 2030 and an 80% reduction by 2050. This can largely be attributed to the residual emissions (shown in figure 3) that result, in part, due to weaker building policies for existing buildings and new construction. Under the current policies modeled, only 75% of existing buildings fuel switch to use clean electricity by 2050, leaving 25% still on natural gas or fuel oil to meet heating needs. Additionally, all new buildings built before 2035 (i.e., when the net zero stretch code is adopted) are still assumed to use gas or oil systems, which won’t be replaced before 2050. For each year that new buildings are not required to be low carbon or net zero, it will be harder to meet the state’s GHG reduction targets. However, it should be noted that this is not a definitive analysis; many of the assumptions in the model are conservative and greater GHG reductions may be possible with additional state and federal support.

Nevertheless, more action is likely needed, and the GHG reductions modeled in this assessment are not a given. The region should consider greater emphasis on existing building decarbonization and new construction policies to drive GHG reductions in the building sector. This could entail more stringent benchmarking and tune up standards, and more support for existing building retrofits, that prioritize fuel switching away from natural gas and oil systems to all-electric systems. Optimistic

assumptions around electrification and retrofit rates are already made under the Policy Scenario, but these assumptions are not currently backed by policy in the region (they should be and should go further). New construction policies should aim to promote all-electric buildings as soon as possible rather than wait for the 2035 net zero stretch code. It is also recommended that the region adopt formal GHG targets to ideally match those set in the Maine Won't Wait plan. Lastly, the region should plan to complete further analysis as formal GHG targets are set and specific policies are implemented. The policy assumptions laid out in this methodology are based on best practices and can be used as a guide for next steps at the regional and community level.

## The Ten Penobscot Climate Action Toolkits -

The toolkits include ten high-priority and high-impact strategies for the region, with resources and information to put these strategies into action.

Click the text to open the toolkit.



## 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

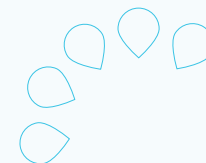
– This area includes updating land use ordinances to reflect future floodplains (based on climate modeling rather than historical storm events), and updating permitted building uses and building design standards for buildings in flood risk zones. Updated building design standards may include elevating 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-

(continued on page 2)

### 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.





(continued from page 1)

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.

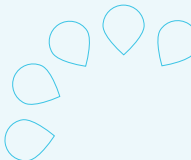
**Host community conversations** - This step can take place throughout the process. Host community conversations with community groups to discuss opportunities and challenges related to designing for heavier rain events and heat, and to build shared understanding about what it will take to create resilient 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).



## CLIMATE ACTION TOOLKIT #2

# Retrofit Existing Housing Stock



PENOBSCOT  
CLIMATE ACTION



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



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

Energy efficient homes have cheaper utility bills, provide better protection in extreme weather, and produce fewer greenhouse gas emissions—contributing to a more affordable, resilient, and low-carbon community. A wide range of organizations and initiatives support housing retrofits throughout the State and region: Efficiency Maine and MaineHousing offer financing, incentives, information, and technical assistance; initiatives like retrofitMAINE, Window Dressers, and the Maine Energy Americorps Program offer outreach, education, implementation support, and trainings; and workforce development partners, including the Maine Community College system, are expanding a skilled workforce for building retrofits. The Penobscot Climate Action region can build on these state and local initiatives to create an expanded and coordinated program to support housing retrofits in the region. This program could include the following components:

**1) Connect residents to energy audits** - This component would involve working with a network of community partners and/or a team of “Energy Ambassadors” that would lead outreach and connect homeowners and landlords with resources to complete an energy audit. Energy audits will help identify the highest priority actions for increasing energy efficiency, provide residents with next steps and resources, and ensure that residents are able to strategically weatherize their homes so that any future installations of energy efficient heating and cooling systems are more effective.

**2) Expand financial support for retrofits** - Create a local program that can supplement and expand the rebates and financial incentives offered by Efficiency Maine, making energy efficient retrofits even more accessible and affordable. Bangor is currently using Community Development Block Grant (CDBG) program funds to provide **additional rebates** of up to \$2,000 to low- to moderate-income homeowners to help cover any remaining costs above Efficiency Maine rebates for heat pump installation and weatherization. This program could be modeled similarly, but would focus on also providing support to landlords to ensure energy efficiency benefits are accessible to renters, as well. Retrofits could focus on weatherization, energy efficiency, electrification, and/or renewable energy options.

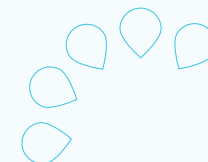
**3) Connect residents with retrofit resources, case studies, and testimonials** - This component would focus on outreach and community conversations with homeowners, landlords, property managers, and renters about opportunities for energy efficiency and/or renewable and resilient energy system retrofits and the barriers or challenges that residents may be facing when trying to take action. The goal would be to develop a set of tailored resources, testimonials, and/or other support as needed to help residents navigate those challenges. This could be led and developed in collaboration with community partners supporting building retrofits, or with an undergraduate or graduate school class or program.

(continued on page 2)

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

- ★ **Equity and Environmental Justice.** Ensuring that housing retrofits are accessible to residents with low incomes, older adults, residents with disabilities, new Mainers, renters, and other priority populations – through expanded financial support, specialized programs, and targeted outreach – will ensure that everyone has access to the cost-savings, comfort, resilience, and environmental health benefits that energy efficient housing can provide.
- ★ **Environmental Health.** Increasing housing energy efficiency will reduce greenhouse gas emissions and other pollutants, slowing the effects of climate change with the additional potential to improve indoor air quality.
- ★ **Community Resilience.** Energy efficient housing can decrease energy cost burden, increase healthy living conditions, and better protect residents in extreme weather, contributing to a healthier, safer, and more resilient community.
- ★ **Regional Collaboration.** This action requires knowledge, resources, and capacity of the local community to support, and will foster collaboration between regional groups, initiatives, academic partners, and companies during implementation.

Photo in upper left: Homes at the intersection of Clinton, High, Ohio, and Hammond Street in Bangor • Photo by Tony Webster





(continued from page 1)

#### 4) Create partnerships with workforce development partners

- Identify ways to strengthen connections between workforce development programs, and the residents who will be making housing retrofits through the housing retrofit campaign. Ensure that local workforce development programs are setting up students to become certified / authorized vendors through Efficiency Maine.

**5) Consider a regional approach** - Consider creating a regional sustainability energy coordinator position that could coordinate with utilities around data requests on behalf of municipalities in the region, serve as a spokesperson and coordinator of regional energy projects, as well as coordinate this type of building retrofit campaign at a regional scale. If this building retrofits program were to be implemented regionally, a municipal cost-share structure would need to be established to offer the expanded financial support to residents across communities.

#### KEY PARTNERS

- **Organizations that support energy and building retrofits**, such as Efficiency Maine, retrofitMaine, passivhausMaine, Window Dressers, and the Maine Energy Americorps Program
- **State partners**, such as MaineHousing and the Maine Office of Energy Efficiency and Renewable Energy
- **Communities with success in building retrofit programs**, such as the Penobscot Nation
- **Homeowners, landlords, and landlord associations**
- **Construction sector**, such as approved / registered contractors through Efficiency Maine
- **Academic partners and building trades and certification programs**, such as Eastern Maine Community College and Kennebec Valley Community College

## Steps for Implementation

### COMPONENT 1

#### Connect Residents with Energy Audits

**Launch a campaign with a coalition** - Launch a campaign to support homeowners and landlords in completing an energy audit. This may include building out a network of local community partners who can champion this outreach (e.g., Maine Energy Americorps, retrofitMAINE, Window Dressers) and/or hiring a team of part-time energy ambassadors to lead outreach. Seek out energy ambassadors who bring an ability to connect and personally relate to people who have lived experience that may make it more challenging to pursue energy retrofits – including people who are low-income, people with disabilities, older adults, people who primarily speak a language other than English, and New Mainers, among other priority populations. Outreach should also focus on connecting with landlords to ensure rental properties are able to benefit. Outreach may include activities at community events; workshops hosted by community-based organizations, community groups, or associations; door-to-door outreach; advertisements in local media outlets; podcast episodes; or other creative means.

**Connect residents with (free) energy audits** - Connect residents with Efficiency Maine, Campus Climate Action Corps programs (e.g., at UMaine), and/or other local energy service providers that provide energy audits. If energy audits are not already offered for free, identify ways to provide gap financing, through grant funding, third party partnerships, or another source.

**Gather energy audit data** - Set up means to collect data on who is reached through the outreach, who pursues an energy audit, and the energy retrofits recommended from the energy audit. This data will both help in assessing the impact of the outreach, as well as support follow-up outreach related to funding, technical assistance, or other support related to home energy retrofits.

### COMPONENT 2

#### Expand Financial Support for Retrofits

**Identify the scope of the program** - Identify the range of activities that will be supported through the program – for example, weatherization, energy efficiency, electrification, and/or renewable energy retrofit options. Identify whether the program will specifically aim to reach certain communities, demographics, or types of property owners and whether the program will have any eligibility requirements.

**Establish expanded financing structure** - Work with Efficiency Maine to develop a funding structure whereby



Building window inserts for weatherization at the 2023 Town of Orono Community Window Insert Build • Photo by Dan Dixon



the municipality provides additional incentives / financial support on top of what is offered through current Efficiency Maine programs. This program could be capitalized through Community Development Block Grant funding, particularly to reach low-income households, and supplemented through other Federal / State funding for energy efficiency efforts. To the extent possible, consider models whereby the service provider is paid directly by the program (rather than requiring that the homeowner or landlord front the cost).

**Consider rolling out a bulk buy program** - Consider rolling out a bulk purchasing program as an alternative or additional way to reduce the cost of renewable and/or energy efficient technology (such as heat pumps or solar hot water systems) for residents. In a bulk purchasing program, the municipality coordinates a “bulk purchase” of a particular technology at a discount, which allows residents to access that technology at a reduced price.

### PRECEDENTS

- **South Portland Electrify Everything Program** - South Portland, ME launched a municipal program that offered rebates that extend beyond what is offered by Efficiency Maine.
- **Lexington HeatSmart Program** - Lexington, MA launched a program in collaboration with the [HeatSmart Alliance](#) that offered incentives, outreach, and advising to homeowners.
- **Tacoma Income Qualified Property Assessments** - Example of incentives and resources for landlords, established through collaboration with the local utility.
- **Boston Retrofit Resource Hub** - Example of a clearinghouse of resources for building retrofits for all types of properties.

### COMPONENT 3

#### Connect Residents with Retrofit Resources, Case Studies, and Testimonials

**Set up a partnership for expanding retrofit resources** – Develop a partnership (or a set of partners) to collaborate with on the development of retrofit resources, which may include local non-profits or advocacy organizations or an undergraduate or graduate school class or program. Identify what would be needed (funding, academic credit, learning opportunities, etc.) for the partnership to be valuable for all parties.

### RESOURCES TO GET STARTED

- **Meeting Maine's Energy Code and Retrofit Trainings** - One-day, in-person local 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.
- **Efficiency Maine** - Efficiency Maine provides guidance, tools, and resources for building retrofits.
- **retrofitMAINE** - retrofitMAINE provides technical information, data, and case studies on building retrofits.
- **Multifamily Retrofit Toolkit** - Toolkit by Enterprise Green Communities with guidance for retrofitting multifamily buildings
- **Mainer's Guide to Climate Incentives** - A State resource that provides guidance and highlights financial support through Efficiency Maine, MaineHousing, and Federal Tax Credits
- **Strategy Recommendations to Mitigate Emissions and Support Resilience in Maine Buildings** - A report provided to the Maine Climate Council from the Buildings, Infrastructure, and Housing Working Group

## Connections Across Existing Work and Other Climate Action Strategies

Maine's climate plan, *Maine Won't Wait*, sets targets for transitioning to cleaner and energy efficient heating and cooling systems, and for accelerating energy efficiency improvements. Much of this work is being rolled out through programs, resources, and incentives coordinated through Efficiency Maine and MaineHousing. Efficiency Maine offers resources, tools, and tips to homeowners (as well as for businesses and municipalities), and provides incentives for energy efficiency projects including heat pumps, weatherization, and appliances. MaineHousing likewise provides programs to assist low-income residents improve weatherization, purchase energy efficient equipment, and offset energy costs.

Locally, the Penobscot Nation on Indian Island has been working to install heat pumps in homes of Tribal members with the greatest need, and recently received an EPA grant to install 150 more. The Penobscot Nation is simultaneously launching a Wabanaki workforce development initiative that will support the community's ability to expand residential energy efficiency retrofits. Many other workforce development partners, including Maine's Community College system, are working to expand relevant green building trades. Kennebec Valley Community College in Fairfield, for example, just opened a new heat pump workforce training lab in 2021.

This action builds on, expands, and fosters coordination across this wide range of initiatives that currently support building retrofits, including connecting residents to existing funding and technical assistance offered by Efficiency Maine and MaineHousing. This toolkit also dovetails closely with Toolkit #7 (Developing resources for businesses) and Toolkit #8 (Supporting green workforce development).



**Identify information and other resource needs** – Work with partners to connect with homeowners and landlords about where they run into sticking points when considering or pursuing building retrofits, and what additional resources may be needed to take advantage of Efficiency Maine or MaineHousing resources.

**Develop resources** - Develop resources to address gaps, collaborating with Efficiency Maine and MaineHousing in the process. Resources may include expanded information, connections to local service providers, or testimonials and case studies from other community members.

**Connect people seeking retrofits to trades programs**

- Work with trades training programs to connect new contractors with home retrofit projects facilitated through this program. See Toolkit #8 (Supporting green workforce development) for more details.

**COST CONSIDERATIONS**

- The scale of the program to support building retrofits (and the scale of financial support) can be calibrated to fit available funding streams. Bangor has traditionally provided up to \$2,000 (per home) in additional incentives beyond what's provided by Efficiency Maine.
- Beyond direct financial incentives, the primary cost is staff time to coordinate the program and compensation for additional program staff (e.g., Energy Ambassadors) to lead outreach, connect residents to audits, and to develop resources, case studies, and testimonials.
- Consider partnerships with nonprofits and academic programs who may already be doing similar work or seeking similar goals in order to share costs, staff capacity, or educational opportunities. Consider coordinating the program regionally to share costs.

**POTENTIAL SOURCES FOR FUNDING**

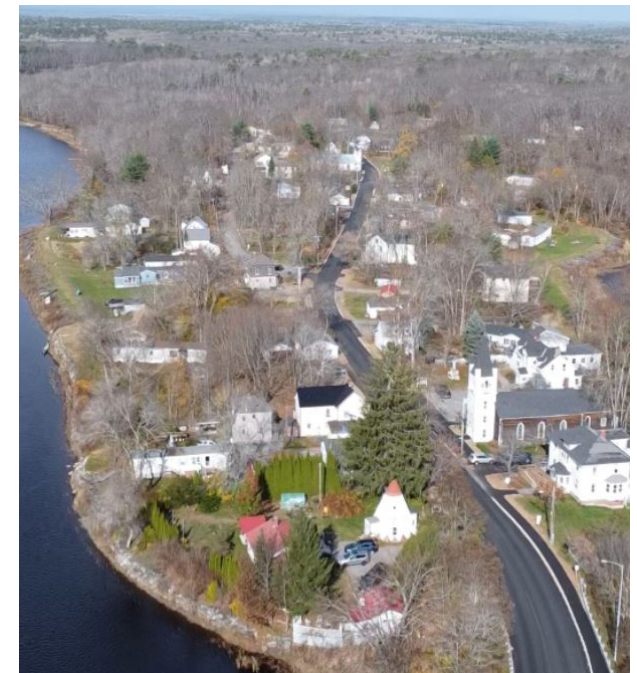
**For toolkit implementation:**

- **Maine Community Action Grants** – Funding for climate mitigation and adaptation efforts, including capacity building, planning, and implementation projects.
- **Community Development Block Grant (CDBG) funding** - Funding that can be allocated to a program to fund building retrofits, particularly for housing retrofits for low-income families. Communities that are not CDBG entitlement communities would need to apply for CDBG funding.
- **The Environmental Justice Government-to-Government Program** - “Provides funding at the state, local, territorial, and Tribal level to support government activities that lead to measurable environmental or public health impacts in communities disproportionately burdened by environmental harms.” The Penobscot Nation just received a \$1 million grant to install 150 heat pumps in homes of Tribal citizens with the greatest need.
- **Energy Efficiency and Conservation Block Grant Program (EECBG)** - Federal funding designated to assist states, local governments, and Tribes in implementing strategies to reduce energy use, to reduce fossil fuel emissions, and to improve energy efficiency.
- **State Based Home Energy Efficiency Contractor Training Grants** - “This program provides \$200 million in grants for States to develop and implement a State program which shall provide training and education to contractors involved in the installation of home energy efficiency and electrification improvements, including improvements eligible for rebates under a HOMES or HEEHRA rebate program.”

**For funding or financing housing retrofits:**

- **Efficiency Maine Residential Incentives** - List of rebates and discounts (and federal tax credits) for homeowners investing in energy efficiency and renewable energy, with different tiers of support based on income. Rental properties with one or two units qualify for these incentives.

- **Efficiency Maine Incentives for Multifamily Buildings** - List of incentives and financing options for commercial buildings (including multifamily buildings with three units or more).
- **MaineHousing Weatherization Program** – MaineHousing’s Weatherization Program provides grants to low-income homeowners and renters to reduce energy costs by improving home energy efficiency.
- **MaineHousing Heat Pump Program** - MaineHousing’s heat pump program pays for the cost and installation of a heat pump for eligible Maine homeowners.
- **New England GrassRoots Fund** - Provides funding for community based climate action initiatives.



Homes on Penobscot Indian Island • Photo by Matthew Dewitt

## CLIMATE ACTION TOOLKIT #3

# Create a Capacity-Building Strategy for Public Transit

BANGOR AREA TRANSIT CENTER



PENOBSCOT  
CLIMATE ACTION



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



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

A Capacity Building Strategy for the Community Connector bus system will identify pathways for meeting current resource and capacity gaps, as well as pathways for meeting resource and capacity needs at various levels of growth. This action would be primarily led by the City of Bangor, as the operator of the Community Connector bus system, with support from the Bangor Area Comprehensive Transportation System (BACTS) and the Transit Committee; nevertheless, collaboration and involvement of municipal and tribal governments not yet served by the Community Connector bus network, as well as other key stakeholders (e.g., education and medical institutions), will both benefit the process and be imperative for working together towards public transportation goals as a region.

Through the Penobscot Climate Action process, community members emphasized the importance of public transportation in advancing equity, climate justice, community resilience, carbon mitigation, and regional collaboration goals. To continue to make progress towards a robust public transit system, it will require both meeting current capacity gaps, and scaling up resources, funding, and staff capacity to make that growth possible. The goal of this toolkit is to more clearly understand “what it will take” to both meet current needs and strategically grow the public transit system as a region.

### Steps for Implementation

#### PHASE 1

#### Groundwork

##### Launch the process with the BACTS Transit Committee

– The Transit Committee, which focuses on regional collaboration around the operations of the Community Connector, would spearhead the development of the capacity building strategy. The Transit Committee includes staff from the Community Connector and the municipalities that financially contribute to the operation of the public transit system; consider if and how the committee can support participation from other constituents (e.g., staff from local governments that may be served in the future by the Community Connector, staff from local transit providers such as Penquis, or others) that may have insight important to the capacity building strategy.

##### Understand community-driven visions for public transit

– Draw on recent and ongoing transportation planning processes that have gathered or are currently collecting insight on community-driven visions for public transportation in the region. Use this insight to assess: What kind of support is there for growth in the public transit system? When community members are envisioning the future of the public transportation system, what are they envisioning? Focus on the insight of community members who will be most impacted by climate change, in particular, including older adults, residents with disabilities, and low-income residents, among other priority populations. Use this

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

- ★ **Equity and Environmental Justice.** Public transportation increases access to affordable transportation options, especially for individuals who are not able to drive or not able to afford a private vehicle.
- ★ **Environmental Health.** Public transportation reduces the number of trips taken in a private vehicle, reducing greenhouse gas emissions and other forms of air pollution.
- ★ **Community Resilience.** Access to resources—whether that’s healthcare, groceries, school, or a job—is critical for community resilience. Public transportation expands access to resources both day-to-day and in an emergency.
- ★ **Regional Collaboration.** The Community Connector bus system operates at a regional scale. Developing this strategy calls on local governments in the region to work together to strategize around resource constraints and make a joint commitment towards growing the transit system.

Photo in upper left: Buses stop off at the Bangor Area Transit Center • Photo by the Community Connector





insight to contextualize current resource and capacity needs (phase 2), as well as to define a set of growth scenarios in line with community goals (phase 3).

**PHASE 2**

**Assessing and Meeting Current Resource and Capacity Needs**

**Outline the capacity of the current Community Connector system** – Outline the current service provided (e.g., total service miles per week and/or other metrics) as well as the capacity and resource requirements to operate the Community Connector sustainably at that scale (e.g., number of buses, drivers, administrative staff, operational budget, capital budget, etc.).

**Assess resource and capacity gaps** – Outline current gaps that may be preventing the system from operating at full capacity. Resource or capacity constraints may include

shortages in vehicles, drivers, administrative staff, or other constraints.

**Host strategic planning workshops** – Host strategic planning workshops with town and city councils to discuss gaps and to identify, assess, and further develop potential solutions. This step could occur at multiple points concurrently with developing a suite of pathways for meeting capacity needs (below).

**Identify pathways for meeting capacity needs** – Consider partnering with a consultant to support this step. Together, research, identify, and evaluate potential pathways for meeting capacity needs through new financing structures, funding sources, as well as other potentially cost-effective service solutions. This process will likely include:

- Exploring cost-effective service models, such as microtransit or vanpool / vanshare programs, that could meet capacity needs or expand service without substantially raising costs. Currently it is difficult to attract and retain drivers with a commercial driver license (CDL); micro-transit may expand the qualified labor pool if a CDL isn't required, and vanpool or vanshare programs may sidestep that challenge altogether.
- Looking into models for restructuring how the Community Connector is funded so that municipal costs are consistent and can be expected a number of years out. Building a consistent funding structure would allow the Community Connector to build and draw from savings, rather than requesting funding on a project-by-project basis.
- Exploring new or expanded revenue streams, which may include modified municipal cost-sharing structures, grants, partnerships, or other revenue streams. Consider business and community partnership opportunities as outlined in Toolkit #4.

**KEY PARTNERS**

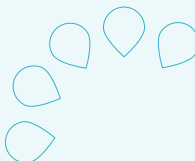
- **City of Bangor, Community Connector**
- **BACTS and the Transit Committee** (with representatives of municipalities that financially support the Community Connector system)
- **Local neighboring governments** currently not yet served by the Community Connector bus network
- **Additional local transit and paratransit service providers**, such as Penquis
- **Community constituents** who depend on, or who could most benefit from, access to affordable, accessible public transit
- **State and Federal partners**, such as MaineDOT and the Federal Transit Administration (FTA)

**Connections Across Existing Work and Other Climate Action Strategies**

This action builds off of and complements a number of actions that are already underway, which are working towards a more robust and high-quality public transit system, including:

- **Implementing a fixed stop system** (as opposed to the current flag-stop operation), and building out amenities based on stop type;
- **Implementing smart bus technology systems**, including real-time bus tracking, mobile payment options, and trip planning functionality on the Community Connector website and on third-party apps (e.g., Google Maps);
- **Conducting a study on how to expand service in the near-term**, including specifically evening service, with the plan to launch pilots based on findings;
- **Conducting a fare structure analysis to identify how to improve the fare structure to be affordable and equitable**, while also eliminating Community Connector staff burden;
- **Launching and running a free commercial drivers license (CDL) training program** through the City of Bangor that connects participants with bus driver and municipal public works positions to fill employment gaps.

Climate Action Toolkits #4 and #5 will also further support the growth of a robust and high-quality transit system.



**Outline and implement promising pathways** – Outline and implement promising pathways to meet resource and capacity needs. Establish regular points for the Transit Committee to evaluate whether the pathways are meeting intended outcomes.

### PHASE 3

#### Outlining Pathways for Growth

**Create growth scenarios** – Use the community-driven visions to craft a set of growth scenarios, such as a slight growth in service, medium growth, and robust growth over different timeframes. The scenarios could be defined by a percent increase in service; for example, the “medium growth scenario” may be defined by a 15% increase in service miles per week. It is recommended that the scenarios avoid specifying specific routes or changes in service; however, it would be useful to note what that increase could look like (e.g., this increase would allow for night and weekend service at a given frequency, etc.).

**Outline capacity and resource requirements** – Using the baseline scenario as a reference, outline the capacity and resource requirements to meet each of the growth scenarios, including staff capacity, operating costs, and capital budget. Consider potential needs for expanded administrative capacity (e.g., grant writing, legal support), and what it might take to retain drivers (e.g., cost-competitive salaries and benefits).

**Host strategic planning workshops** – Host strategic planning workshops with town and city councils to discuss resource and capacity needs to enable growth and to identify, assess, and further develop potential solutions. This step could occur at multiple points concurrently with developing a suite of pathways for meeting capacity needs.

**Identify pathways for meeting capacity needs** – Consider partnering with a consultant to support this step. Together,

research, identify, and evaluate potential pathways for meeting capacity needs. These will likely include expanded models of what is identified for meeting existing needs and/or potential pathways that may seem most viable within a longer timeframe.

### PHASE 4

#### Ongoing Community Conversations

**Host a series of community conversations** – Bring the findings of the capacity building strategy to a wide range of community spaces to discuss opportunities for growing the public transportation system and what it would take to invest in this growth as a region. These spaces may include, for example, town/city councils, local universities, large employers, youth spaces, among others. The goal would be to both continue to build support for the public transit system, as well as share ways that business or community partnerships may help play a role in expanding sources of revenue. See Toolkit #4 for more details.

#### COST CONSIDERATIONS

- BACTS is able to lead the planning process; BACTS staff time and any consultant fees can be covered by FTA §5303 Urban Transit Planning Funds.
- Funding sources and financing pathways for meeting resource and capacity needs will be identified through the capacity building strategy.

#### POTENTIAL SOURCES FOR FUNDING

- **FTA §5303 Urban Transit Planning Funds** to facilitate the development of the capacity building strategy (including the planning process and any consultant costs).

#### PRECEDENTS

- **Building Revenue Sources (2015)** - Article in Mass Transit, highlighting examples of different revenue streams used by four different transit agencies.

#### RESOURCES TO GET STARTED

- **Local Funding Options for Public Transportation (2023)** - This study by the Victoria Transport Policy Institute compiles a wide range of literature and research documenting potential revenue streams for public transit systems. The Institute is based in Canada, but most revenue streams are also applicable within the States.
- **APTA Economic Impact of Public Transportation Investment (2020)** – This study models the economic impact of investing in public transportation, and provides a great “business case” for the Community Connector growth scenarios. The study looks at three different growth scenarios (business as usual, medium growth, and larger growth) and models the benefits to the economy and cost savings to residents and businesses (for both users and non-users of public transit) correlated with every dollar invested.
- **Transportation Investment Strategy Tool Documentation (2023)** – The Transportation Investment Strategy Tool was developed to help states or regions in the northeast calculate potential outcomes of various low-carbon transportation strategies. See section 4.5.2 “Bus Operating Improvements” (page 43) for assumptions that may be useful for developing the growth scenarios, such as the “estimated percent change in ridership per percent change in service level.”
- **APTA Transit Workforce Shortage (2022)** – This report summarizes root causes of driver shortages and provides recommendations for meeting workforce needs.



# CLIMATE ACTION TOOLKIT #4

## Partnerships to Promote Active and Public Transit



**PENOBSCOT**  
CLIMATE ACTION



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



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

The primary action of this toolkit is to foster partnerships with local businesses and key community organizations around active and public transit. These partnerships can benefit the transportation system in the region by increasing funding for transit services through advertising and potential route sponsorships, sharing resources and information about transportation options to make them more easily accessible and increase ridership, and expanding the reach of public and active transit opportunities. This action can be implemented through some or all of the following components:

**Transportation Hub Website** - Create a single website that is a one-stop shop for all transportation-related information for the region. The site can house information and link to the Community Connector, regional bus systems, paratransit programs, rideshare and vanpooling options, information for walking and biking (e.g., maps of trail and bike networks, maps of bike parking), and transportation opportunities and incentive programs. Concentrating all of this information to be found on or linked to one website will make the information easier to find and navigate, removing barriers to ridership and community participation. While not directly a partnership with a business or organization, this is an important action to house information about the following partnership actions.

**Employer-Sponsored Commuter Routes** - Work with large employers in the region and the Chamber of Commerce to create new transit routes or extend existing

ones to be convenient for employee commutes. Employer sponsorship, or pay-in, can be a method of bringing revenue into the transit system in addition to increasing ridership among employees and others who may also use the route. This strategy can also apply to any larger apartment complexes in the region who may be interested in convenient transit as a selling-point for tenants, and to senior centers or living facilities that may want to establish or expand mobility options.

**Vanpool/Vanshare Program** - Establish a vanpool/vanshare program in areas that aren't served by existing bus routes. Residents can sign up and rent a van for a certain regular commute or other trip with a small group of people. This service can be available for a monthly fee split between all participating vanpool members, set based on duration and frequency. This is often much more affordable than each individual needing their own personal vehicle, reduces vehicles on the road, and is a source of income for the transit system. A vanpool/vanshare program can require less staffing than establishing regular routes to serve similar purposes, and can be a great option when there are staffing or funding challenges. This would be a good option to explore as part of a microtransit study.

**Launch a campaign with GO MAINE** - Collaborate with GO MAINE in order to expand its reach and benefits to the Bangor region. This collaboration could take many forms, but would focus on 1) increasing the number of local businesses participating in the GO MAINE rewards programs, and 2) increasing the number of people

(continued on page 2)

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

- ★ **Equity and Environmental Justice.** A key aim of transit partnerships with businesses and organizations is to expand public and active transportation systems. Safe and reliable transit options make it more affordable to commute and reach community resources and necessities, and make these essential activities more accessible for individuals who can't afford or aren't able to drive a personal vehicle.
- ★ **Environmental Health.** More robust and successful public and active transportation systems reduce greenhouse gas and other emissions by reducing individual vehicle trips.
- ★ **Community Resilience.** Public transit provides reliable access to resources and services both regularly, and in emergencies. Additionally, when businesses and organizations are invested in and connected to transit systems, it makes for more reliable and varied sources of financial, social, and logistical support, providing stability and resilience for this essential resource.
- ★ **Regional Collaboration.** Many existing transit services like the Community Connector and BACTS are already regional. Enhancing these services and involving more stakeholders, businesses, and community organizations in the region fosters stronger ties and connections between all of these communities and makes travel among and between them more accessible.

Photo in upper left by Bicycle Coalition of Maine

(continued from page 1)

participating in the rideshare features to make ridesharing more feasible in the region. This campaign can reach out to local businesses about the free GO MAINE Lunch and Learn programs for employers. Employers may be interested, because participation in GO MAINE can help reduce parking needs, offer vanpool programs to assist with employee commutes, contribute to sustainability and emissions goals, and promote active transportation (linked to healthier, more productive employees). Additionally, there are participant rewards offered through GO MAINE and the WAY 2 GO MAINE bi-annual event.

**Employer Transit Benefit Program** - Collaborate with the Bangor Chamber of Commerce to roll out the employer transit benefits program recommended in the Stantec Bangor Transit Study Final Report (pg. 27, 2019) and proposed by the Community Connector. In a transit benefits program, employees are able to pay for transit using pre-tax dollars, which creates cost savings for both employees and employers.

**Transportation Demand Management** - Work with large employers to integrate transportation demand management strategies into wellness policies and/or adopt a citywide / townwide transportation demand management policy. The most robust version of this action involves adopting an ordinance with certain transportation demand-related requirements for employers above a certain size and municipalities themselves. The following strategies are often included in these requirements or recommended as opt-in programs for employers: parking cash out (employees who do not drive personal vehicles are offered the equivalent value of a parking space in cash); travel allowances (which offset the cost of parking, transit, or other modes of transportation equally); free or subsidized transit passes; tax-free benefits for transit and vanpool costs (via Employer Transit Benefit Program);

carpool/vanpool parking priority spots; secure, covered bike parking (and showers); shuttle service from a transit stop; and business wellness programs rewarding active transportation (potential area of collaboration with GO MAINE).

**Events hosted by local businesses and community partners** - Work with businesses, schools, libraries, and other community-based organizations to host or sponsor events that celebrate and encourage active and public transportation (e.g., bike or bus breakfasts). Work with community resources and cultural centers including libraries and schools to host active/transit programs (e.g., walking school buses, bike to school weeks, bike to the library prizes). Additionally, these community-based organizations are great places to disseminate information in the form of posters, flyers, and pamphlets about public transit routes, programs and how to use them, and active transit programs and health benefits.

**Partner with universities in the region** - This action can be incorporated into many of the other actions in this toolkit depending on community need and student interest. Ideas include website building, program information brochures, creative promotional materials or videos, business outreach and event planning, and more.

**Public transit advertisement program for local businesses** - Continue to expand the program for local businesses to advertise on buses, vans, bus stop infrastructure, and for highlighting local sponsors on the transportation hub website. This would be an additional source of revenue for the transit system and provide businesses with mobile advertising space. Establishing a pathway, process, and rates for advertisements and hosting the information and application on the transportation hub website, would provide a streamlined process and could facilitate more business participation.

## Connections Across Existing Work and Other Climate Action Strategies

This toolkit builds on existing and growing momentum to support public and active transportation in the region through business and community partnerships. The Community Connector has started to develop an Employer Transit Benefit Program and a Transit-Supportive Toolkit for the Development Community, in line with recommendations from the Bangor Transit Study (2019). Additionally, GO MAINE offers a statewide platform for encouraging active and public transportation modes through programs, incentives, and partnerships with businesses and employers, though it is currently more relevant in the Portland region.

The Transportation Hub Website and information sharing recommendations of this toolkit, along with the vanpool/vanshare program, should coordinate with the recommendations in Toolkit #5 (Foster Complete and Walkable Neighborhoods) and Toolkit #3 (Create a Capacity Building Strategy for Public Transit) to align resources, information, and initiatives around public transportation options.

Photo by the Community Connector





## Steps for Implementation

Employer engagement is a necessary first step for a number of the strategies listed above. For the sake of efficiency and effective communication, the outreach for many of the components – and specifically for the employer transit benefits program, transportation demand management, advertisement program, and employer-sponsored commuter routes – can be combined into a single outreach process outlined below:

### PHASE 1

#### Preliminary Employer Outreach

**Define topics for outreach** – Decide on and clarify a menu of ways employers can engage with transportation systems. This might include the Public Transit Advertisement program, Employer Transit Benefit Programs, Employer-Sponsored Commute Routes, and voluntary Transportation Demand Management (TDM) strategies outlined above. At this stage, the process of defining each of these strategies should include a definition of the type of program, how it works, what the benefits are to employers, and what the benefits are to the transportation system and public. For the TDM strategies, municipalities can develop a preliminary checklist of TDM strategies that businesses can voluntarily opt into with the idea that it could eventually become required as policy.

**Identify businesses for program input** – Inventory a cross-section of large and small businesses, including those that currently participate in transit-supportive activities or that have in the past (e.g., through the existing advertisement program, a previous route expansion, etc.). Work with Chambers of Commerce and other business groups to identify additional businesses that are highly active in the public sphere, engaged in community activities, mission-driven, or large employers in the area.

**Conduct outreach** – Use connections through previous contacts, Chambers of Commerce, etc. to reach out to the identified businesses to gauge interest in each of the programs (or reach out directly if there are no readily available connections). Be prepared with the clear articulations of each of the programs (step 1) and a proposition for the businesses to have a conversation at a later date discussing the programs, and what they find appealing and unappealing about each of them. If there is funding available, these can be offered in a lunch and learn format as incentive to participate.

### PHASE 2

#### Partnership and Program Development

**Host a focus group** – Collect all the feedback received from the initial conversations with businesses to shape the focus group conversations and questions. Meet with business owners and potentially employees, either individually or collectively. Present the strategies and ask people what seems doable and beneficial, and for the things that are not, what could be improved to make business participation more likely?

**Define programs** – Use the feedback from businesses, along with examples from precedents elsewhere, to define program details and logistics, including processes for enrollment and/or program rollout.

**Advertise programs** – Present the finalized programs to the businesses that participated in the focus group, and work with Chambers of Commerce and business groups to widely advertise the programs. Building awareness of the programs may include ongoing outreach by municipal staff to existing and new businesses, advertisements in local media outlets or local listservs, hosting events (e.g., lunch and learns, green drinks, webinars) with local organizations or businesses, or other modes.

### KEY PARTNERS

- **Community Connector, City of Bangor**
- **BACTS and the Transit Committee** (with representatives of municipalities that financially support the Community Connector system)
- **Local and statewide organizations and advocacy groups** supporting transportation, such as GO MAINE, Bicycle Coalition of Maine, and Transportation for All
- **Local businesses and business groups**, including Chambers of Commerce, downtown organizations, and industry groups
- **Large employers and institutions**, including universities and colleges, hospitals
- **Community spaces**, including schools, libraries, senior centers, and apartment complexes, and assisted living facilities

Bike parking • Photo by Greg Edwards



## PRECEDENTS

- **Choose Your Way Bellevue, Go Howard, and Ride Together** - These are three great examples of “transportation hub” websites that concentrate information about transit options, programs, and events.
- **King County Vanpool and Vanshare** - This vanpool and vanshare program in King County, Washington provides options for groups of people to commute together and split costs.
- **Ten Cities’ Strategies for Transportation Demand Management** - This is a collection of policy- and service-based strategies and actions implemented by ten different cities as part of Transportation Demand Management.
- **METRO Partnership Opportunities** - This is a collection of strategies identified by Houston’s METRO for businesses to partner with the public transit system.

## COST CONSIDERATIONS

- Costs will vary notably depending on the action items pursued; rolling out a vanpool / vanshare program will be the most cost-intensive in terms of upfront costs (over \$1 million), whereas other steps such as the advertisement program only require staff time.
- Grants under “potential sources for funding” can help cover the planning, program development, and capital costs (as relevant) associated with these actions.
- Most importantly, effectively rolling out these actions will require staff capacity, which is limited for the Community Connector currently. Identifying strategies to expand capacity (via Toolkit #3: Create a Capacity Building Strategy for Public Transit) will be needed to enable this toolkit, as well.



Crosswalks at Main Street and Mill Street • Photo by Town of Orono

## RESOURCES TO GET STARTED

- **MAPC Parking and Transportation Demand Management** - This resource describes a variety of parking and transportation demand management strategies, along with a few case studies of municipalities who have implemented them.
- **Transportation Toolkit for the Business Community** - This guide is a compilation of 14 fact sheets on topics related to transit-business partnerships that highlight strategies and why they are beneficial to employers, employees, and transit systems.
- **In Motion Tool Kit** - This tool kit is a guide to implementing a public and active transit campaign (with goals similar to GO MAINE) based on and provided by the In Motion program in King County, WA.
- **Sustainable CT** - The Sustainable CT program compiles actions for municipalities to take on to increase sustainability. See 6.3 “Encourage Smart Commuting.”

## POTENTIAL SOURCES FOR FUNDING

- **MaineDOT Grants** - including Reconnecting Communities and Neighborhoods Program, Rural Surface Transportation Grant Program, RAISE Grant.
- **Federal Transit Administration Grants** - including Accelerating Innovative Mobility, Enhancing Mobility Innovation, Surface Transportation Block Grant Program, Integrated Mobility Innovation, Public Transportation Innovation, Rural Transportation Assistance Program, Technical Assistance and Standards Development, Tribal Transit Formula Grants, Urbanized Area Formula Grants.
- **FTA §5303 Urban Transit Planning Funds** - BACTS can support background preparation and promotion of active and public transit through general assistance planning funds.

# CLIMATE ACTION TOOLKIT #5

## Foster Complete and Walkable Neighborhoods



**PENOBSCOT**  
CLIMATE ACTION



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



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

Complete neighborhoods are places where all residents, regardless of age, ability, or income have access to daily life necessities—including high-quality and affordable housing, schools and other civic functions, food, open space, healthcare, and other services—within 15 minutes by walking, biking, or public transit.<sup>1</sup> The Penobscot Climate Action region can take a proactive approach to fostering complete neighborhoods. Each community in the Bangor region may approach this differently, and yet in each case, it would involve a process for identifying specific neighborhood areas (for example, denser mixed-use areas or town centers), assessing those areas based on a set of complete neighborhood features, identifying gaps, and investigating specific interventions that would support those neighborhoods in becoming complete neighborhoods. The interventions will likely include some or all of the following approaches:

#### Zoning updates to support transit and walkability

– Identify changes to zoning that will support transit and walkability, such as allowing and incentivizing mixed-use development, enabling higher densities and infill development, adapting commercial first floor design standards to create vibrant streetscapes, reducing or eliminating parking minimums in specific areas, requiring or encouraging bike parking, and enabling neighborhood

community gardens and food forests. In some cases, these zoning changes may need to be accompanied by other types of supportive policy; for example, allowing winter on-street parking.

#### Zoning updates to support diverse and affordable housing

– Identify changes to zoning that will support diverse and affordable housing, such as enabling higher density and infill development, reducing minimum lot sizes, adopting density bonuses for affordable housing, and enabling diversity of housing types, including supportive housing. A starting point would be to update zoning and land use policies to align with State Legislation LD 2003, which includes a set of enabling policies to support housing production.

#### Complete streets policy

– Adopt a complete streets policy to ensure that all future street upgrade or new construction projects integrate complete streets design standards whenever practicable. “Complete streets” are a type of street design that prioritize safe and comfortable travel by people of all ages, abilities, and incomes by all modes of transportation. Features such as accessible sidewalks, separated bike lanes, and frequent and safe opportunities to cross the street are examples of complete street features. BACTS will develop complete street guidelines and draft policy language for different size municipalities to support this step; see Appendix A for more details.

(continued on page 2)

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

- ★ **Equity and Environmental Justice.** Complete neighborhoods reduce transportation costs and increase access to daily life needs, including high quality and affordable housing, schools and other civic functions, food, open space, and other amenities and services. While this outcome benefits everyone, it can most greatly benefit older adults, people with disabilities, people with lower incomes, new Mainers, and other individuals who may not have a car.
- ★ **Environmental Health.** Complete neighborhoods make it easier to reach all daily needs by walking, biking, and public transit. Fewer trips by cars or trucks reduce greenhouse gas emissions and other forms of air pollution.
- ★ **Community Resilience.** Complete neighborhoods make it easier to access resources and opportunities – whether that’s healthcare, groceries, school, or job. Greater access to resources builds community resilience both day-to-day and in an emergency.
- ★ **Regional Collaboration.** This toolkit encourages a network of complete neighborhoods that are connected by public transit routes and bike paths throughout the region. By working together to create this network, it expands the benefits of complete neighborhoods (including greater access to resources and opportunity) at a regional scale.

<sup>1</sup> Adapted from Portland’s Plan 2030. (<https://view.publitas.com/city-of-portland/portlands-plan-2030/page/1>)





(continued from page 1)

### Capital projects to support complete neighborhoods

– Identify specific capital projects that would support walkable, complete neighborhoods, such as installing sidewalks, crosswalks, bike lanes, or other complete streets projects; amenities such as bus stop shelters or bike parking; connections to multi-use trail networks; or neighborhood amenities such as small parks, community gardens, or food forests. Consider using demonstration projects to show the functionality and benefits of complete street projects while working towards more permanent infrastructure.

### Partnerships and incentives to support complete neighborhoods

– In some cases, additional support may be needed to bring businesses or services into neighborhoods to cluster amenities in a walkable, transit-oriented area. Consider financing partnerships or incentives that can help offset costs of developing or bringing services to the neighborhood. Similar partnerships or joint financing strategies may also be needed to ensure affordable housing is developed in walkable, transit-oriented town centers.

#### KEY PARTNERS

- **City, town, and tribal governments in the region**
- **Regional organizations**, including BACTS and Eastern Maine Development Corporation
- **State organizations**, including MaineDOT
- **Public transportation providers**, such as the Community Connector and Penquis
- **Neighborhood constituents**, including businesses, organizations, and residents within the complete neighborhood areas
- **Community constituents** who depend on, or who could most benefit from, access to affordable public transit

## Steps for Implementation

### PHASE 1

#### Identifying Neighborhoods

**Identify neighborhoods of focus** – Select one or more neighborhoods to focus on for complete neighborhood efforts, and define the geographic boundaries. Small communities may choose one area (e.g., the town center or business corridor), whereas larger communities may choose a few neighborhoods to focus on. When a number of neighborhoods are a possibility, consider prioritizing neighborhoods with higher proportions of lower income residents, communities of color, or other priority populations. This process can also be iterative and repeated for more neighborhoods over time.

**Co-define vision and goals** – Host conversations with businesses, organizations, and residents within the neighborhood to discuss the concept of complete neighborhoods, and to collectively define opportunities, a vision, and goals for the process. This step could be conducted in tandem with identifying a neighborhood of focus to ensure community support.

### PHASE 2

#### Complete Neighborhoods Assessment

**Define assessment metrics** – Identify a set of evaluation parameters to evaluate how well a neighborhood is meeting complete neighborhood goals; consider using a framework like the **TOD Standard** as a starting point, and adapting the set of evaluation parameters to best fit local needs. Consider working with a team of neighborhood constituents in the process of vetting and refining the evaluation metrics.

**Assess strengths and gaps** – Evaluate the neighborhood based on the complete neighborhood parameters,

## Connections Across Existing Work and Other Climate Action Strategies

Bangor, Orono, Brewer, Hampden, and Old Town are currently participating in the **Village Partnership Initiative**. Under this program, each city/town has identified specific areas of their downtown for assessment, with a focus on features such as safety and traffic calming, active transportation networks, and reducing parking redundancy.

Phase two will involve implementing recommendations from the study, many of which will support complete neighborhood goals. Bangor has also been working to cluster residential zoning areas and transit routes, coordinate bus stops near new housing developments, and integrate mixed use development into commercial zoning areas. Both Bangor and Orono have been working to increase density and housing options in downtown areas.

Climate Action Toolkit #4, which focuses on working with local businesses and organizations to promote public transit and active transportation, will dovetail with the efforts to foster complete neighborhoods. It's also worth considering how community resilience hubs (Toolkit #9) could be a component of complete neighborhoods.

identifying both strengths and gaps. Consider working with a team of neighborhood constituents to conduct the evaluation together, and holding community conversations to discuss the findings with broader groups of neighborhood constituents.

**PHASE 3**

**Ongoing Implementation of Interventions**

**Identify interventions** – Identify and implement interventions to strengthen complete neighborhoods, which may include identifying changes to zoning (e.g., enabling mixed-use, higher density, parking reform, incentivizing or requiring proximity to transit for certain uses, etc.) as well as specific capital projects (e.g., complete street projects). It may also involve identifying business incentives or other approaches for bringing businesses or services into those areas to cluster amenities in a walkable, transit-oriented area. If neighborhoods aren't already on a bus route, work with Community Connector to explore options for bringing public transportation services to that area. Work with local community constituents to vet project ideas and to partner on projects as applicable.

**Connect regionally** – If conducting this process as a region, work together to map and discuss the network of identified neighborhoods as a region as a way to coordinate approaches and consider transportation connectivity between the neighborhoods.



Students on the way to school • Photo by Bicycle Coalition of Maine

**PRECEDENTS**

- **How Complete are our Neighborhoods?** - A GIS StoryMap of Portland, ME that talks through the concept of complete neighborhoods, and how the City is using GIS to assess complete neighborhoods.
- **Zoning for Great Neighborhoods** - A number of resources developed by the State of Vermont to support Vermont communities in developing walkable, complete neighborhoods.
- **Plan Forward** - Lincoln-Lancaster County (Nebraska) 2050 Comprehensive Plan, which breaks down many zoning and land use components to supporting complete neighborhoods.

**RESOURCES TO GET STARTED**

- **The TOD Standard** - The TOD Standard is a set of guidelines for transit-oriented development projects, developed by the Institute for Transportation and Development Policy. While not all factors will apply, it could provide a useful set of metrics for assessing how well a neighborhood meets “complete neighborhood” goals.
- **LEED for Neighborhood Development (ND)** - The LEED for Neighborhood Development certification by the US Green Building Council (USGBC) outlines a set of metrics for developing more sustainable, well-connected neighborhoods.
- **Just Communities Protocol** - The Just Communities Protocol includes metrics, indicators, and a process for collaborating around neighborhood development to create just and sustainable neighborhoods.
- **Sustainable Development Code** - A resource that compiles example policies and land use codes from across the country. See “Chapter 4: Mobility and Transportation” for resources on complete streets, public transit, and bicycle and pedestrian mobility, and “Chapter 5: Community” for resources on housing affordability and housing diversity.

**COST CONSIDERATIONS**

- Depending on municipal capacity, the first few steps of this toolkit will likely be completed in-house; consultant costs to support the neighborhood assessment, policy review, and policy development may range from \$20k - \$150k, depending on scope.
- The upfront costs for the implementation of capital projects will be much more cost-intensive, but may dovetail with existing capital maintenance and/or be supported by State and Federal grant funding opportunities (below).

**POTENTIAL SOURCES FOR FUNDING**

- **MaineDOT Planning Partnership Initiative** - to conduct a planning process for identifying and investigating interventions for fostering complete neighborhoods; to plan projects towards complete neighborhoods
- **MaineDOT Village Partnership Initiative** - to plan / implement projects towards complete neighborhoods
- **Maine Housing Opportunity Program** - to support housing development, including municipal ordinance development, community housing planning services, and community housing implementation services
- **MaineDOT Bicycle and Pedestrian Program** - to implement projects towards complete neighborhoods
- **Community Development Block Grant Program** - to support a range of community projects, which may include infrastructure, housing, downtown revitalization to public facilities, and economic development
- **US DOT RAISE Grant Program** - to support surface transportation projects that advance safety, equity, economic development, and climate and sustainability goals
- **Funding earmarked for demonstration projects** (e.g., MaineDOT Pilot Project Initiatives, BACTS Safe Streets and Roads for All funding)

## CLIMATE ACTION TOOLKIT #6

# Adapt Land Management and Conservation to Support Resilience



PENOBSCOT  
CLIMATE ACTION



**HIGH POTENTIAL**  
to build community  
resilience



While this toolkit may not directly reduce emissions, expanding and conserving green spaces can contribute to carbon sequestration benefits that offset emissions in the region.

### Description of the Action

The Penobscot Climate Action region's ecosystems are integral to community resilience. They provide flood mitigation, clean the region's drinking water, cool off hot neighborhoods, and sequester carbon. Regenerating soil health, managing invasive species, fostering habitat connectivity, and supporting plant and wildlife diversity also contribute to ecosystem resilience which in turn supports community health, well-being, recreation, and the local economy. Indigenous knowledge, science and stewardship practices are foundational to many resilient and regenerative practices. It would be essential for this action to be developed with great respect for traditional ecological knowledge. In cases where there is mutual commitment to respect, collaboration, and partnership, this action should be developed under the leadership of, and in collaboration with, the Penobscot Nation.

By implementing this toolkit, municipalities will adopt resilient land management and conservation practices in their comprehensive plans, ordinances, and zoning. Subsequently, the toolkit will support education and engagement to facilitate understanding and adoption by municipalities, organizations who steward private lands, and individual parcel owners. Regional collaboration, by jointly developing or sharing regulatory language, conducting assessments and legal review, or supporting educational initiatives, provides opportunities to be efficient with limited resources and maximize effect given that ecosystems span municipal boundaries.

### Steps for Implementation

Adapting land management and conservation practices to support resilience can be carried out in three parts. They can be developed and implemented individually and may not occur in a stepwise fashion. For example, a best practice may be identified and piloted before serving as an example to integrate into municipal practices or policy. Further, communities may wish to conduct education and engagement activities concerning a proposed policy change in order to develop community understanding and buy-in prior to government action.

#### PART 1

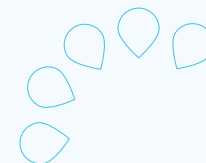
#### Municipal Resilient Land Management Resource Guide Development

The Resource Guide will include goals and model language for land management and conservation policy that can be incorporated into a community's comprehensive plan, ordinances, and zoning. These may address zoning for development, agriculture, parking, landscaping, protection of natural systems, stormwater management, and more. This guide may provide language for policies or ordinances that would make some of the best practices in Part 2 mandatory. Steps include:

**Form a project team** – Form a project team comprised of relevant municipal staff and board/commission member(s), legal expertise, and subject matter experts who bring technical and lived expertise.

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

- ★ **Equity and Environmental Justice.** While expanding resilient ecosystems will benefit the entire region, it has the potential to bring greater value to developed areas and areas with lower access to ecosystem benefits. However, care must be taken to ensure other community needs (such as housing affordability) are supported in tandem and not at odds with expanding healthy and resilient green spaces in order to best support equity and climate justice goals.
- ★ **Environmental Health.** Supporting the health and resilience of ecosystems contributes to a wide number of environmental health benefits, including improved biodiversity, cleaner water systems, and healthier soils and trees.
- ★ **Community Resilience.** Protecting and expanding the health and resilience of natural systems will better protect the community from flooding, extreme heat events, and mitigate economic impacts to the region's outdoor recreation and tourism economy.
- ★ **Regional Collaboration.** Using shared resources and processes to assess and draft model language is a more efficient way of supporting all municipalities to act on this strategy. The sharing of best practices and learning from pilots in individual communities is another way to expand adoption.





**Conduct a policy review** – Review municipal policies, ordinances, and zoning in relation to the municipality’s (or region’s) resilience goals and collect model language (from examples within the region or beyond) of resilient land management and conservation practices. Keep in mind that findings may recommend repeal or relaxation of existing policies and ordinances that hinder goals (such as Bangor’s 2023 vote to ease code enforcement on lawn heights to allow **No Mow May**). Consider cases in which a policy may not be applied uniformly (e.g., only in certain cases or only to a specific part of the municipality) in order to reach an intended resilience goal, and conduct assessments to determine the parameters as necessary.

#### KEY PARTNERS

Because of the different pathways available, this strategy involves many key partners such as:

- **Those who will research and advise on best practices** (e.g., Penobscot Nation, University of Maine, Trust for Public Lands, First Light Foundation);
- **Those who will be responsible for drafting and implementing local ordinances and zoning** (e.g., Planning Boards/Planning staff, Public Works, Tree Boards, Trails Committees);
- **Those who steward, manage, and develop land and who will implement practices** (e.g., Bangor Land Trust, Orono Land Trust, Brewer Land Trust, Penobscot Nation, University of Maine, Water Districts, Contractors and Landscapers, Parks & Recreation Departments); and
- **Those who can support community education and engagement** (e.g., Arbor Day at local schools, Orono Town Council potlucks, Mitchell Center, Maine Discovery Museum, University of Maine, Husson University, Fields Pond Audubon, Community Gardens).

**Conduct a legal review** – Conduct a legal review and revisions for any model language to ensure applicability with current laws and within the State of Maine.

**Lead community conversations to support adoption** – Education and dialogue with the public and municipal boards and commissions will be necessary for building shared understanding around the policy changes and their implications, incorporating revisions to address community concerns or additional insight, and for building buy-in that will lead to eventual adoption.

#### PART 2

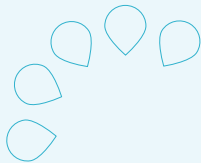
### Best Practices for Resilient Land Management and Conservation

Building upon the wealth of knowledge and experience in the region, this action will focus on developing a collection of best practices for resilient land management and conservation in the region. These best practices may or may not have a regulatory link. For example, guidance for managing the urban tree canopy in ways that support tree health, ecosystem functions, and reduced urban heat may require a change in practice but not a change in community ordinances. These best practices could be voluntarily adopted by municipal, Tribal, private landowners, landscapers and other professionals, and residents. The best practices collection can include case studies of where these practices have been implemented with an emphasis on local examples. This action may be led by Penobscot Nation, university partners, land trusts, and/or similar partners who bring technical and lived expertise. As an optional added scope, this action’s working group may identify funding for further research on the effectiveness of these practices in the Penobscot Climate Action region or to conduct pilot projects to

## Connections Across Existing Work and Other Climate Action Strategies

The region is rich in precedents and resources to build upon. For example, Bangor will have lessons learned to share from its recent tree inventory and promotion of “No Mow May.” Orono uses citizen science to monitor the invasive brown tail moth. The Penobscot Nation is deeply involved in land stewardship efforts and monitoring the effects of climate change on nature. The Penobscot River Restoration Project was a local success story of bringing diverse stakeholders together to restore an ecosystem and important community asset. UMaine conducts research on sustainable and climate adapted forest management and numerous collaboration opportunities exist with its students and faculty.

This strategy will likely intersect with land management practices in Update Zoning and New Development Standards (Toolkit #1). The Resilient Hubs Network (Toolkit #9) may provide the infrastructure for ongoing community education and engagement.



implement certain practices. Local lessons learned can then be shared with others in the region to facilitate adoption.

Topics to be addressed can include but are not limited to:	To support:
<ul style="list-style-type: none"> <li>• Forests management and conservation</li> <li>• Urban tree canopy management and expansion</li> <li>• Increasing green space</li> <li>• Green infrastructure</li> <li>• Wetlands protection</li> <li>• Vernal pools protection</li> <li>• Soil health and regeneration</li> <li>• Habitat connectivity</li> <li>• Turf management at multiple scales including residential</li> </ul>	<ul style="list-style-type: none"> <li>• Flood storage/mitigation</li> <li>• Heat mitigation</li> <li>• Water quality</li> <li>• Invasive species management</li> <li>• Recreation and well-being</li> <li>• Biodiversity</li> <li>• Protection of existing stored carbon</li> <li>• Ongoing capacity to sequester carbon</li> </ul>

### PART 3

## Community Education, Engagement, and Incentives

There is a significant opportunity to involve all community members in supporting resilience through land management. Partnerships with schools and municipalities, universities, or other groups can support educational programs that teach children about the environment around them, how it is changing, and how our actions can have an impact. Offering ongoing community education on resilient land management practices can foster adoption at the residential/property scale (e.g. encouraging **No Mow May**, **Pollinator Gardens**, depaving and low impact development), by professionals such as developers and landscapers, as well as increase understanding of and support for changes in municipal land management requirements and practices. Incentive programs, in the form of tax incentives or cost-sharing/free materials, can be used to encourage adoption and installation of resilient land management practices.



## Opportunities for a Regional Approach

**Part 1: Municipal Resilient Land Management Resource Guide Development** - This task may be approached as a regional effort with model language for a variety of management and policy actions that individual municipalities can use, as applicable. A regional project team of involved municipalities and partner organizations could lead this effort.

**Part 2: Best Practices for Resilient Land Management and Conservation** - Grant funding to support this step may also allow for a regional approach since best practices are likely to apply to multiple communities.

**Part 3: Community Education, Engagement, and Incentives** - Community organizations and partners who engage with more than one municipality may be able to partner with municipalities and offer education and other programs regionally, benefiting a broad audience.

### COST CONSIDERATIONS

- Much of this work (for parts 1 and 2) could be led and completed by a municipal or regional task force; consultant costs to support facilitation and development of resources may range from \$20k - \$150k, depending on scope.
- Part 3, in particular, is likely to be implemented jointly between a range of partners, including municipalities, nonprofits, community groups, schools, universities, and other partners, leading to opportunities for cost-sharing and collaborations on securing grant funding.

### POTENTIAL SOURCES FOR FUNDING

- **Maine Community Resilience Partnership Grants** - funding for resilience capacity building, planning, and implementation projects.
- **Project Canopy Assistance Grants** - available to state, county, and municipal governments, educational institutions, and non-profit organizations for developing and implementing community forestry projects and programs.
- **MaineDOT Climate Initiative Funding Opportunities** - includes the Municipal Stream Crossing Program to upgrade municipal culverts to improve fish/wildlife habitat and safety and the Maine Infrastructure Adaptation Fund for municipal, tribal, and infrastructure districts to adapt their critical infrastructure to reduce vulnerability to climate change.
- **Invasive Plant Management Program Grants** - available to landowners with parcels of at least 10 wooded contiguous acres. There is funding available to create invasive plant control practice plans and separate funding for execution of these plans.
- **The Land and Water Conservation Fund** - available to assist the State of Maine, counties, municipalities, school districts, and tribal nations in the acquisition and/or development of public outdoor recreation facilities.
- **Recreational Trails Program** - available to municipalities and non-profits for maintenance of recreation trails.
- **Clean Water State Revolving Fund Green Project Reserve** - available to communities, nonprofits, and other local government entities for wastewater infrastructure projects and other water pollution control projects.

## PRECEDENTS

### Planning and Zoning

- **Regional Planning for Resilient Zoning** - The towns of Jericho, Bolton, Huntington, and Richmond, VT, working with state agencies and other partners, engaged in over a decade of collaborative planning to inventory natural systems and understand community values to inform land use planning and update zoning. Two outcomes included [Jericho, VT's Natural Resources Overlay](#) and [Bolton, VT's updated zoning laws](#) which increased the size of conserved lands to preserve ecological connectivity and functions and protect critical wildlife habitat.
- **Nashua River Communities Resilient Lands Management Initiative** – was a project conducted by Clinton and Bolton, MA that resulted in a [Climate-Smart Development Regulatory Prioritization Tool](#), a set of recommendations for regulatory updates that support the integrity and continued viability of landscapes before, during, and after development
- **Stormwater and Flood Resilience Utility Ordinance** – proposed ordinance in Dover, NH to establish a dedicated funding mechanism to pay for the community's stormwater management and flood resilience activities; resources include an FAQ and StoryMap to support community understanding.
- **Sustainable Development Code** - A resource that compiles example policies and land use codes from across the country. See "Chapter 1: Environmental Health and Natural Resource" for policies related to protecting water quality, urban forests, and sensitive lands, among other topics.

### Community Training, Education, Engagement

- **"100 Resilient Yards" Program** - seeks to expand regenerative practices at a residential scale in Portland and [South Portland](#). The program provides training and resources such as native plants and seeds.
- **Knox-Lincoln Soil & Water Conservation District** – includes extensive community education programs for children and adults as well as publications on conservation and forest practices.

- **Sustainable Neighborhoods Program** - an initiative launched by the City of Portland that engages neighborhoods, with guidance from city staff, to organize workshops, projects and events that enhance the livability of their neighborhood and reduce residents' ecological footprint. Participating neighborhoods may receive designation as a "Participating Sustainable Neighborhood" or an "Outstanding Sustainable Neighborhood" from the City.
- **Aspetuck Land Trust's Green Corridor** - provides guidance to link isolated fragments of habitat in backyards into a unified natural area to support plants and wildlife, improve water and air quality, and more.
- **Various Citizen Science programs** exist to engage and educate the public while collecting important data about climate change and related topics (e.g., biodiversity) such as [Earthwise Aware at the Fells](#).

### Incentives and Rebates

- **CalWater Lawn-to-Garden Rebate Program** - provides incentives of \$3 per square foot of turf lawn removed for residential and commercial water service account holders.
- **Agricultural Resilience Incentive Grant** - is administered by Santa Clara County, CA. The program developed a list of pre-approved practices that improve soil health and provides grants to support adoption.

## RESOURCES TO GET STARTED

- **Climate Resilient Land Use Strategies** – is a compendium of regulatory language and policy examples from the (Massachusetts) Metropolitan Area Planning Council's member communities and beyond addressing floodplain and wetland restrictions, tree protection, water conservation, and more.
- **Climate-Smart Lawns and Landscapes Care Guide and Forest Care Guide** - provide climate-smart best management practices. Guides are available in multiple languages and for multiple audiences.
- **Maine Vernal Pool Special Area Management Plan** – allows vernal pool impacts in certain developed areas of a municipality in exchange for conservation of high value vernal pools in the municipality's rural area. It supports a municipality's goals for growth, compact development and conservation; allows development of parcels otherwise limited by the presence of vernal pools; provides a funding stream for land conservation and conserves landscapes that provide multiple values including increased resilience to a changing climate.
- **City of Bath Tree Ordinance (Section 6-111.D)** - includes language that may be used to require the replacement of trees removed from public rights of way.
- **City of Bangor Public Tree Program** - provides model bylaw language for Bangor's tree board, city forester, and associated provisions relating to the city's trees and forests



Boulder Pond • Photo by Town of Orono



## CLIMATE ACTION TOOLKIT #7

# Develop a Climate-Ready Business Resource



**PENOBSCOT**  
CLIMATE ACTION



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



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

This toolkit is intended to support the Greater Bangor region in developing a resource to help local businesses identify and implement actions that support regional greenhouse gas emissions reduction goals and build resilience to climate change. The Climate-Ready Business Resource, or “the resource” will contain a list of actions, of varying scales, that local businesses can pursue. This resource will highlight financial, environmental, and other relevant data that will help those businesses evaluate costs and benefits of implementation. Additionally, the resource will provide a clearinghouse of existing local, regional, state, and federal incentives, rebates, tax credits, subsidies, loans, grants, and other financial resources to support the implementation of included actions. A list of local contractors and service providers who can support the implementation of actions can also be linked to the resource to support implementation. A large part of this action will center on identifying existing guidance and resources (such as those available through Efficiency Maine), and packaging and delivering them to local businesses in a way that is accessible and meaningful to them.

To support uptake of actions listed in the resource, the Greater Bangor Region can work with local partners to develop a technical assistance program that will assist businesses in understanding options for increasing sustainability and resilience, completing more precise cost-benefit analyses, and making an implementation plan. Once this resource is available, municipalities

would work with the Bangor Chamber of Commerce, other local business groups, educational institutions, and other partners to connect the resource to those who may benefit.

### Steps for Implementation

#### PHASE 1

#### Foundation and Strategy

**Identify a lead implementation partner(s)** – The Climate Action Committee would identify a lead implementation partner or group of partners who will spearhead the implementation of this toolkit. The implementation partner(s) may be a regional organization, local nonprofit, and/or academic institute or center that focuses on economic development, sustainability, and climate resilience goals, and that has the capacity to lead toolkit implementation. The Climate Action Committee would work with the lead implementation partner(s) to discuss the toolkit vision, define a formal collaboration process, and identify pathways for funding. The partner(s) would not necessarily be responsible for implementing all actions of this toolkit, but would ensure that they are being carried forward. The lead implementation partner(s) may be the same as the lead implementation partner(s) for Toolkit #8; if not, coordination would be beneficial.

**Conduct outreach to understand local business needs and priorities** – Conduct outreach with the local business community to identify needs and priorities related to a

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

- ★ **Equity and Environmental Justice.** This action will help expand access to resources and information that can support resilience and energy and cost savings for small businesses in the Greater Bangor region, including rural and economically disadvantaged areas. This action could address equity more deliberately by focusing outreach and technical assistance to minority-owned businesses, women-owned businesses, small businesses, and other similar designations.
- ★ **Environmental Health.** This action will support local businesses in adopting practices that reduce their environmental impact, including reducing greenhouse gas emissions, improving air and water quality, and reducing waste. The advising service will further help businesses integrate environmental health considerations into their decision-making.
- ★ **Community Resilience.** This action will compile information and resources to support businesses in building resilience to climate change. Many types of building and energy retrofits, for example, can help reduce the impact of extreme weather, keep employees safe, and avoid business interruptions.
- ★ **Regional Collaboration.** Because this is a regional resource, there will be a collaborative regional effort between municipalities, business groups, and regional organizations to develop, implement, and house the resource and associated technical assistance.

Photo in upper left: Solar panels on Mason's Brewing in Brewer • Photo by Matthew Dewitt

range of actions to reduce greenhouse gas emissions or strengthen climate resilience. Conduct interviews and surveys to understand how the resource can be best designed to suit their needs. Explore attitudes about concept and intent of the resource, attitudes around potential actions, starting points, needs, motivations, design and format preferences, and barriers to implementing actions. This step can be combined with research initiatives in Toolkit #8.



### Opportunity for Municipal Action

**If municipalities want to get started** on the development of climate-ready business resources independently, they could consider working with an academic partner at a local community college or university to design a course or a service learning project centered on developing a set of specific business resources. To ensure that the project is achievable within a semester, the project could zero in on a specific scope, for example: renewable energy installations on commercial buildings, green procurement practices for food service industries, or energy efficiency retrofits for small businesses. Students would conduct outreach to businesses, and work with partners, including the municipality, to identify and develop resources and information that would support business needs. The information gathered and resources developed would both support businesses independently, and could be shared with the Climate Action Committee, or the lead implementation partner(s) once established, to support the regional effort.

**Identify a set of actions to include in the climate-ready business resource** – Based on information generated through research efforts, identify and select a set of actions businesses can take to reduce greenhouse gas emissions or support climate resilience that will be included in the resource. Consult and collaborate with relevant partners (e.g., Efficiency Maine, Maine DEP, EPA, green technology providers, organizations working in waste reduction innovation, utility and energy companies, industry associations, and others) to home in on specific actions and to identify existing and new resources (e.g., technical information, funding streams, advising services, etc.) that would best support businesses. Work in conjunction with municipal staff during this step to identify ways actions could dovetail with new or existing programs offered by the City or Town (e.g., bulk buy programs for energy-efficient heat pumps). Include a range of actions, ranging from simple to more complex, and from low-cost to larger investments.

**Design approach to the advising service** – Identify an approach for delivering the advising service component of the resource. This may include building out capacity or capabilities within municipalities or within a regional organization, or funding a new regional position to serve as a dedicated technical assistance service provider. For this step, the advising service role should be able to serve across municipal boundaries when possible.

#### PHASE 2

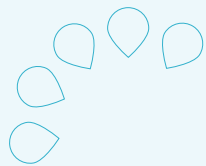
### Resource Design and Content Development

**Develop the content of the climate-ready business resource** – The content of the resource will depend on the needs identified by local businesses and the actions identified. Components will likely include a) financial,

### Connections Across Existing Work and Other Climate Action Strategies

This action is likely to draw on and expand on the resources provided by Efficiency Maine, which are geared towards supporting Maine businesses (as well as homeowners and municipalities) in increasing energy efficiency and installing renewable energy technologies. Efficiency Maine currently offers a suite of informational resources, energy cost calculators for different technologies, connections to certified vendors and contractors, technical assistance, as well as rebates, loans, and incentives for energy efficiency and renewable energy investments.

This action is also intended to complement the implementation of Toolkit #8 Design and implement a green trades training and subsidy program. The resource should include links to local contractors and service providers participating in the Green Trades and Subsidy Program Together, Toolkit #7 and Toolkit #8 provide knowledge and resources for local businesses to implement green, sustainable, and resilient actions.



operational, and environmental data to help businesses make strategic decisions about investments; b) a clearinghouse or list of relevant local, regional, state, and federal funding sources, financing resources, or technical assistance to support the actions in the resource; and c) connections to certified local contractors and service providers who can support implementation of actions (e.g., Efficiency Maine

certified vendors, or custom referral networks developed for the resource). Consider opportunities for alignment with Toolkit #8, which includes efforts to strengthen green trades training and job pipelines.

**Create case studies of local businesses that have implemented actions** – Identify a range of local businesses (different sizes, different products/services) that have already implemented actions in the resource. Interview them to generate stories about their motivations and the benefits their businesses have seen as a result of those actions. Additional case studies can be built out as more businesses use the resource.

**Design and produce the resource** – Use stakeholder feedback to determine the format of the resource (e.g.,

website, app, physical booklet, etc.). Once format(s) are determined, work with a graphic designer/web-designer to design and put together resource content (i.e., actions, cost-benefit data, financial resources, local contractor and service provider list, case studies).

**Define role for municipalities to support Climate-Ready Business Resource uptake** – Municipal staff can support the uptake of actions in the Climate-Ready Business Resource in a variety of ways (e.g., direct outreach, posting information on municipal websites, events). For this step, explicit ways that municipalities can contribute should be defined in coordination with municipal staff. Because municipalities across the region will have varying degrees of capacity to encourage local businesses within their municipalities to implement practices in the Climate-Ready Business Resource, a range of options should be identified.

#### KEY PARTNERS

- **Local business groups and industry associations** (e.g., Bangor Region Chamber of Commerce, Downtown Bangor, Maine Small Business Development Center – Bangor)
- **Educational institutions and centers within academic institutions** (e.g., UMaine, Husson University, Eastern Maine Community College, UMaine Cooperative Extension, Mitchell Center for Sustainability Solutions)
- **Municipal staff** (e.g., Municipal Economic and Community Development Departments)
- **Regional environmental and economic development organizations** (e.g., EMDC)
- **Efficiency Maine**
- **Local businesses and landlords**
- **Green construction sector**, (e.g., contractors, service providers, green technology providers)
- **Utilities and energy companies**

#### PHASE 3

##### Resource Implementation

**Build out the advising service** – Identify and secure funding, training or capacity development, or staff or operational needs to support the advising service.

**Pilot test the resource implementation** – Pilot test the resource with a select group of local businesses to test the effectiveness of the resource, referral networks, funding mechanisms, and advising service. Make necessary adjustments to improve the initiative.

**Launch the resource and advisory service** – Roll out the initiative to all local businesses in the region. Work with a range of partners (e.g., municipalities, business groups, sustainability groups, etc.) to host events, conduct outreach, and widely spread information on the resource and program.



#### Opportunity for Municipal Action

**Another opportunity for municipalities** to contribute to this toolkit independently is to support the generation of case studies. Identify and list local businesses in the municipality that have implemented green actions. Additionally, municipalities could have conversations with those businesses about the green actions and benefits to their businesses they've seen as a result. The list and notes from these conversations can be shared with the Climate Action Committee or lead implementation partner(s).



Downtown Hampden • Photo by Matthew Dewitt



**Develop evaluation and maintenance plan** – Establish a system for regular documentation and reporting of the initiative’s progress, achievements, and challenges. Additionally, establish a system to regularly maintain and update the resource, for example with new actions as they become relevant, with updated data and case studies, and with new contractors and service providers. This evaluation process would be a great opportunity to collaborate with local academic researchers.

**Celebrate success** – On a regular basis, identify opportunities (at regional and municipal levels) to celebrate and showcase local businesses that implemented actions from the resource. These celebrations can be used to

#### PRECEDENTS

- **Sustainable Business Guide from the Sustainable Business Network of Greater Philadelphia** – A guide targeted towards local businesses, outlining different actions that businesses can take to advance sustainability goals. The guide offers a variety of actions in the categories of water, energy, waste, transportation, and social impact.
- **Greening Your Organization Toolkit from Vermont Businesses for Social Responsibility** – Two toolkits to support green actions by local organizations in the categories of 1) waste, energy, water, or toxics and 2) transportation. These toolkits offer frameworks for thinking through organizational transitions to green practices.
- **Raleigh Sustainable Business Toolkit** – A collection of resources and programs to support Raleigh businesses in reaching sustainability goals and goals of the Raleigh Community Climate Action Plan. Categories include building improvements, commuting and transportation, energy efficiency, waste reduction, and stormwater and water quality. An easy-to-digest slideshow of the information is also provided.

further promote the resource, and also create pathways for other local businesses to learn first-hand about the benefits of implementing actions that support sustainability and resilience.

#### RESOURCES TO GET STARTED

- **Questionnaire to Assess Green Business Practices** – This is a questionnaire used by researchers at Ohio University and Loyola University Chicago to explore drivers and barriers to the adoption of green business practices of Small and Medium Enterprises. A revised version of this questionnaire may serve as a good starting point for conducting research with local businesses. The peer-reviewed research article that details the results and interpretation of the findings from the implementation of the questionnaire is available here.
- **Efficiency Maine** – Efficiency Maine offers a significant suite of resources and programs for businesses in Maine, including rebates and incentives, financing resources, technical assistance, connection to certified vendors and contractors, and more.
- **Mainers’ Guide to Climate Incentives** – A resource developed by the Maine Climate Council that details financial support from state and federal programs to help Mainers make smart, climate-friendly investments for their business or home.
- **Database of State Incentives for Renewables and Efficiency** – The DSIRE includes links to programs and incentives, searchable by state.
- **Maine DEP Green Business Certification** – A certification program offered by the Maine Department of Environmental Protection that awards businesses for being “environmental leaders,” based on adopting a variety of environmental policies and practices.

#### COST CONSIDERATIONS

- The cost of the project will depend on the capacity of implementation partner(s), the amount of funding that the partner(s) would be needed to lead this work, and whether a consultant is brought on to help facilitate the process. This budget may range from \$75k to \$250k, depending on scope.
- A budget for the advising service may be equivalent to one full-time staff person, annually, with variability depending on the scope of services and programs offered.
- If a municipality decides to work directly with an academic partner on a smaller, specific set of business resources, project costs may include staff time; Make sure that any student and faculty time is valued accordingly through direct funding, academic credit, and/or learning opportunities.

#### POTENTIAL SOURCES FOR FUNDING

- **Maine Community Action Grants** – Funding for climate mitigation and adaptation efforts, including capacity building, planning, and implementation projects.
- **Energy Efficiency and Conservation Block Grant Program (EECBG)** – Federal funding designated to assist states, local governments, and Tribes in implementing strategies to reduce energy use, to reduce fossil fuel emissions, and to improve energy efficiency, including developing and launching programs that will support those goals.
- **EPA Sustainability Research Grants** – Federal grants geared towards supporting the development of research, methods, programs, or tools that support sustainability.
- **USDA Energy Programs, USDA IRA Programs** – Funding for agriculture and rural businesses to complete energy audits, make energy efficiency improvements, and install renewable energy systems.

## CLIMATE ACTION TOOLKIT #8

# Strengthening the Green Trades Pipeline



**PENOBSCOT**  
CLIMATE ACTION



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



**HIGH POTENTIAL**  
to build community  
resilience

### Description of the Action

This action supports the Penobscot Action Region to grow the region's green trades and workforce development in ways that simultaneously support economic development, greenhouse gas emissions reductions, and climate resilience goals. The objective of the action is to build on existing programs for green workforce development, identify opportunities to fill gaps or for growth, and to strengthen direct links between these programs and local businesses or employers. The results of this initiative may include developing a new program or curriculum, adapting an existing program to include new skill sets or practices, or developing new partnerships to connect training opportunities to other Penobscot Climate Action goals and programs (such as housing retrofits or supporting climate-ready businesses).

Green trades include those affiliated with **Maine's clean energy sector** – such as renewable energy installation, energy efficient building construction, installation of efficient heating and cooling systems, and technicians for electric vehicles and charging infrastructure. They can also include industries in sustainable building materials (e.g., Maine's cross-laminated timber industry), waste management (e.g., composting, recycling, or material reuse industries), or ecosystem services (e.g., green infrastructure installation, adaptive forest management), among other fields. Ultimately, this action can create new career opportunities for individuals pursuing the trades or currently in the trades, while simultaneously supporting the region's transition to a resilient, low-carbon economy.

### Steps for Implementation

#### PHASE 1

#### Foundation and Strategy

**Identify a lead implementation partner(s)** – The Climate Action Committee would identify a lead implementation partner or group of partners who will spearhead the implementation of this toolkit. The implementation partner(s) may be a regional organization and/or educational partner that focuses on economic development or workforce development and training goals, and that has the capacity to lead toolkit implementation. The Climate Action Committee would work with the lead implementation partner(s) to discuss the toolkit vision, define a formal collaboration process, and identify pathways for funding. The partner(s) would not necessarily be responsible for implementing all actions of this toolkit, but would ensure that they are being carried forward. The lead implementation partner(s) may be the same as the lead implementation partner(s) for Toolkit #7; if not, coordination would be beneficial.

**Conduct outreach to understand opportunities for green trades workforce development** – Conduct interviews, focus groups, and/or surveys to assess challenges, gaps, and opportunities to strengthen workforce development in green trades. This step would include talking with 1) businesses and service providers about workforce shortages or skill gaps in specific sectors; 2) industry professionals about opportunities to adapt practices and facilitate

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

- ★ **Equity and Environmental Justice.** This action expands access to economic and workforce opportunities in growing sustainability industries, particularly in more rural areas with more limited access to jobs. It likewise creates pathways for Mainers from a range of backgrounds to lead the transition to a resilient, low-carbon economy. This action can be designed to target and benefit communities that face cumulative barriers to economic and workforce opportunities, such as residents with disabilities, low-income residents, new Mainers, and/or veterans.
- ★ **Environmental Health.** This action supports the development of a skilled workforce that can grow industries, technologies, and practices that support environmental health and a low-carbon economy, whether through renewable energy installation, high-performance building practices, or climate-adaptive forest management, for example.
- ★ **Community Resilience.** A diverse and talented workforce is the basis for a resilient economy—one that can adapt, innovate, and withstand downturns or climate hazards. This action can build resilience by expanding access to economic opportunity, strengthening the workforce, and supporting the growth of sectors that support climate resilience.
- ★ **Regional Collaboration.** This action prompts collaboration across the region between training programs, local businesses and employers, economic development organizations, and municipalities to strengthen a regional workforce and regional economy.



growth of sustainable industries; 3) education, training, and workforce development partners to discuss existing programs, plans for new programs or program growth, and existing challenges; 4) students who have gone through training programs about experience and outcomes; and 5) individuals seeking to enter various green trades. This step could be paired with research initiatives in Toolkit #7.

#### **Identify local training providers to lead or partner with**

– Drawing on the findings from the outreach, coordinate conversations with local training providers that have experience with workforce development programs, or have existing programs that can be built on to strengthen the green trades pipeline in the region. Discuss outreach findings and explore the potential for those training providers to lead or participate as partners in this action.

#### **KEY PARTNERS**

- **Local training providers** (e.g., Eastern Maine Community College, Eastern Maine Development Corporation, United Technologies Center, UMaine)
- **Contractors and service providers in the region**
- **Educational institutions** (e.g., UMaine, Husson University, Eastern Maine Community College)
- **State partners** (e.g., Maine Governor's Energy Office, Clean Energy Partnership)
- **Businesses and industry experts in selected green trade(s)**
- **Municipalities**
- **Regional organizations** supporting economic development (e.g., Eastern Maine Development Corporation)
- **Individuals interested in growing their green trade skills**

#### **PHASE 2**

#### **Program Design and Development**

**Program design and planning** – The lead implementation partner(s) in collaboration with training provider partner(s) will identify a primary approach (or set of approaches) for strengthening green trades workforce development in the region. Pathways may include developing a new program; adapting an existing program to include new curricula; expanding the reach of the program or who has access to the program; developing new approaches to connect students to the program; creating new partnerships to connect students to future employers or job opportunities, or other approaches. The lead implementation partner(s) would outline the details of the initiative, including goals, target trades, target students, training delivery approaches, and partners and potential participating employers, as relevant.

**Conduct a skills assessment and research existing industry standards** – For the development of any new curricula or program, research key technical skills, knowledge, abilities, and competencies needed for green trade(s) of focus. Explore industry standards, certifications for selected trade(s), and existing training programs, and identify opportunities to learn from or leverage pre-existing

**Consider ways that training programs could simultaneously provide hands-on experience for students, while supporting other Penobscot Action Goals – for example, supporting building retrofits for landlords or homeowners, energy efficient equipment installations for businesses, or providing services for municipal contracts or programs.**

#### **Connections Across Existing Work and Other Climate Action Strategies**

The State and partners across the State have launched a number of initiatives in the last three years that focus on strengthening Maine's workforce, specifically in clean energy jobs. In 2020, Maine's climate plan, *Maine Won't Wait*, set targets for doubling Maine's clean energy jobs by 2030, and in 2022 the Governor's Energy Office awarded \$2.5 million in grants to clean energy employers, industry associations, educational institutions, and nonprofits to support curricula development, training programs, job placement services, and other activities related to workforce development.

A large number of high schools, community colleges, universities, and nonprofits in the Greater Bangor region currently support workforce development and training programs, some with existing or emerging programs in green trades (e.g., Eastern Maine Community College's programs in solar installation, HVAC systems, and energy efficient building construction). Organizations such as Efficiency Maine and passivhausMAINE provide online and statewide trainings on topics such as solar PV design and installation, heat pump training, and building and energy code workshops.

This action will build off these initiatives, focusing on targeted efforts to strengthen workforce development within the Greater Bangor region, expanding on current successes or filling gaps, and considering green trades beyond clean energy sectors. This action will play a key role in supporting the success of other toolkits, and is especially intended to complement the implementation of Toolkit #7 - Develop a Climate-Ready Business Resource. Together, Toolkit #7 and Toolkit #8 provide knowledge and resources for local businesses to implement investments and practices that reduce greenhouse gas emissions and build climate resilience.

resources. Consider ways that training programs can help students meet requirements for existing certifications or provider networks (e.g., Efficiency Maine registered vendors or qualified partners). Consult industry experts to understand industry and emerging trends and technologies. This step may be more or less necessary depending on training provider partners and the pre-existing programs that are being built on.

**Identify and apply for funding for implementation** – In collaboration between the Climate Action Committee, lead

#### RESOURCES TO GET STARTED

- **Maine Clean Energy Workforce Analysis Report (2022)** – This report assesses the workforce and hiring landscape for clean energy jobs in Maine, including employer needs and challenges, awareness and perceptions of residents seeking jobs, and the clean energy training landscape. See the Appendix for an inventory of Maine Clean Energy Training Programs by county. Also see affiliated reports: [2021 Maine Clean Energy Industry Report](#) and [2022 Maine Offshore Wind Talent Analysis](#).
- **Expanding Pathways to Quality Jobs in Austin's Growing Green Economy Report** – This report provides a high-level overview of the green economy landscape in Austin. The report answers questions such as: What defines green activity and jobs? What public and private sector institutions are engaged in the green economy? What is the current status of the local workforce development system? What are the opportunities for green job growth in the region? This report could provide a useful framework for thinking about the local green economy ecosystem.
- **Efficiency Vermont- Weatherization Workforce Plan** – This is a state-level workforce plan that details the results from a survey of the weatherization workforce landscape in Vermont. This can be useful for brainstorming approaches for conducting the skills assessment and research into industry standards.

implementation partner(s), and training partner(s), identify funding mechanisms to support the development, rollout, and ongoing operation of the workforce development initiative identified. Different funding mechanisms may be required for different components.

#### PHASE 3

#### Program Implementation

**Launch the workforce development initiative** – Roll out the initiative. For initiatives that involve a new, adapted, or expanded program, establish connections with interested contractors, service providers, educational institutions, nonprofits, and others who may be interested in benefiting from or supporting this workforce development initiative. Together, launch a recruitment and enrollment campaign to attract individuals interested in joining the green trades or further developing their skills and certifications.

#### PRECEDENTS

- **Greenfield Community College HVAC Workforce Development Program** – A state grant funded heating, ventilation, air conditioning (HVAC) training program housed with the Greenfield Community College in Massachusetts. Its intention is to improve equity in the green workforce.
- **NySERDA Workforce Development and Training Programs in clean energy** – A state-level program, directed towards meeting the state's clean energy future goals, that connects people, businesses, service providers, and training providers with opportunities that support green and clean-energy workforce development.
- **Building Greener Futures: Green Jobs Training and Bioswales in New Haven, CT** – A partnership between city, nonprofit, and academic stakeholders to train high school students from underserved communities and recently incarcerated individuals with the skills to install green infrastructure and plant trees in the community.

**Gather feedback for evaluation and improvement** – Seek feedback from training providers, participants in the program, and businesses or employers affiliated with the program. Make necessary adjustments based on stakeholder feedback. As relevant, develop a plan for scaling up the initiative or expanding to additional skill sets based on lessons learned and successful outcomes. Plan for long-term sustainability of the action.

#### COST CONSIDERATIONS

- The cost for Phase 1 will depend on the capacity of the implementation partner(s), the amount of funding that the partner(s) would be needed to lead this work, and/or whether a consultant is brought on to help facilitate.
- Costs for Phase 2 would be dependent on the initiative identified. The grants listed below may be able to support specific initiatives.

#### POTENTIAL SOURCES FOR FUNDING

- **CDBG Workforce Development Grant Program** - Provides funding for creating a new or enhancing an existing training program in Maine to address skills shortages.
- **Federal BIL and IRA funding earmarked for workforce development** - The Maine Governor's Energy Office is tracking federal funding opportunities designed to support contractor training, energy auditor training, and skills training.
- **Maine Jobs and Recovery Plan** - Funding administered through the Maine Department of Education to support a range of workforce development efforts.
- **Community Change Grants** - EPA funding for community-based organizations (in partnership with Tribes, local governments, and/or higher education) for climate justice activities, including workforce development.

## CLIMATE ACTION TOOLKIT #9

# Expand Community Hubs for Resilience

### Description of the Action

Resilience hubs are community-serving – and often community-led but supported by local government – places that share resources and information, provide care during disasters, and support year-round community programming focused on climate resilience and other community needs. Resilience hubs can look and operate differently in different places based on community needs. Resilience hubs can be physical places that are accessible and have been made resilient to disasters like floods, heat waves, and power outages in order to serve as cooling centers, warming centers, or places of refuge. They may be located in community centers, libraries, housing complexes, places of worship, or similar spaces.

The Penobscot Climate Action region has an established network of warming and cooling centers managed by municipalities and community-based organizations. Additionally, the region includes community-based organizations that support community resilience in a variety of ways such as supporting food access, housing security, and more. This toolkit focuses on a community-driven approach to strengthening and expanding this network to ensure resilience to climate hazards like flooding, storms, and extreme heat as well as identifying ways to build upon and provide resources to this network so that it can meet additional community needs.

Planning will include assessing existing capacity (e.g., community spaces and programs that currently support community resilience), identifying gaps or needs for

specific services (e.g., warming/cooling centers, community kitchens, mutual aid, educational programming, other), and outlining approaches to expand on existing capacity or fill gaps. Planning will also include outlining an operational plan for the network, including how the network will coordinate around long-term capacity and strategy, as well as communicate and coordinate resources in emergencies. Efforts should include a focus on addressing the needs of people who will be disproportionately impacted by the effects of climate change, particularly unsheltered people or people facing food insecurity. Further, it will be critical for these actions to be developed in conversation with any transportation related efforts, since access to shelter and food is dependent on access to transportation in the region.

### Steps for Implementation

#### PHASE 1

#### Groundwork

**Inventory Existing Capacity and Assess Gaps** – Conduct an inventory of existing spaces and services that support community resilience, considering existing warming and cooling centers' locations, populations served, historical demand/usage, amenities (heating, cooling, kitchen, emergency power, flood protection, public transportation, ADA accessibility, etc.) to identify gaps and how to fill them. Community kitchens have been discussed as a possible added service; similar additional community needs should be identified in this phase. This phase would also collect information on community-based organizations that are



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

- ★ **Equity and Environmental Justice.** Resilience hubs are designed to meet the needs of the community. As community-serving, community-led assets, they should take care to address needs of the region's most vulnerable residents during crises and year-round.
- ★ **Environmental Health.** Resilience hubs are ideally housed in buildings that have been built, or retrofitted over time to be energy efficient and powered by renewable energy systems, such as solar and storage. Year-round programming at the resilience hubs can also increase resource and information sharing on energy efficiency or sustainability resources for residents.
- ★ **Community Resilience.** Resilience hubs support community resilience through providing a resilient physical location (e.g., accessible warming and cooling centers during a climate hazard) as well as build social resilience by providing a means to share information, resources, and care among community members, community organizations, and municipalities.
- ★ **Regional Collaboration.** Many of the community organizations who will participate in and support the operation of resilience hubs are regional organizations and the hubs can serve as a way to connect them with residents throughout the community. Further, the region could establish a central staffing or governance entity to facilitate the activities of resilience hubs across the region.

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Photo in upper left by Town of Orono



interested in supporting a resilience hubs network and how (e.g., with space, outreach, staff/volunteers, materials, etc).

**Establish Project Team, Build Partnerships, Set Goals –**

Working as a region, the key partners for implementation should be convened to set short and long-term goals for the resilience hubs network based on data gathered in Step 1 and capabilities of the key partners. This may include a vision for incrementally building capacity for the municipality/region from expanding cooling capacity at existing warming centers to eventually providing year-round programming with added services that have been identified as needs. It may be important to identify a way to support a regional coordinator of the resilience hubs network with various community-based organizations and municipalities supporting individual sites or services provided across sites. Resilience hub network partners’ capabilities and

commitments could be documented in a memorandum of understanding (MOU). In addition to an MOU, an outcome of this partnership-building effort should include a plan for governance of the resilience hubs network including a framework for decision-making and a plan for ongoing communication.

**PHASE 2**

**Program Design and Development**

**Identify & Evaluate Sites –** This step will include evaluating existing and potential new community resilience hubs sites to understand suitability to provide services as part of the resilience hubs network. Things like proximity to transportation services, flood vulnerability, and other resiliency features will be important to assess as will

**KEY PARTNERS**

- **Community buildings** (e.g., schools, libraries, youth/senior centers, places of worship, community organizations) and others who could provide space for resilience hub activities)
- **Municipalities**
- **Community health programs and programs working with unsheltered people** (e.g., Northern Light, Needlepoint Sanctuary, Brick Church, etc.)
- **Community-based organizations** (e.g. Food and Medicine, Maine Multicultural Center, Penquis, UMAINE cooperative extension, senior centers, energy efficiency/heating assistance programs, organizations working with immigrants and new Mainers, etc.)
- **Transportation providers** (e.g., Community Connector, Penquis, etc.)
- **Emergency management agencies & volunteer organizations** (e.g., Penobscot County Emergency Management Agency, Penquis Medical Reserve Corps)



**Opportunity for Municipal Action**

**The steps under Phase 1: Groundwork** are envisioned as a regional planning effort; however, an individual municipality could do this work individually. The primary benefit of a regional effort is to minimize the time commitment for community-based organizations who provide services to multiple communities. Next steps will vary based upon the outcome and goals set. It is likely that project-specific funding to enable facility improvements or fund expanded programming will be sought at this stage. Subsequent steps could be led by community-based organizations who will be hosting or managing resilience hubs with municipal support, or vice versa. Different models may be used in different communities. The following steps are likely to be taken for specific sites or services that the project team pursues.

**Connections Across Existing Work and Other Climate Action Strategies**

The region has a well-established network of warming centers that are used on the coldest days of the year, especially by unsheltered people, and provide charging locations when power outages impact the region. There is an opportunity to build upon this network to ensure these sites are resilient to power outages and to add cooling capabilities. Should the resilience hubs include year-round programming, they can be a venue to provide education and share resources that support healthy and thriving communities. Regional planning has identified many organizations and partners who have resources to share but would benefit from being part of a network to reach a wider audience with their information and services. This toolkit could align with Complete and Walkable Neighborhoods (Toolkit #5) considering how resilience hubs could be a component of complete neighborhoods.

consideration of the specific needs of the population the site will serve. It’s also important to consider whether the facility or organization is trusted by the population to be served. Sites in the region’s resilience hubs network may operate differently based upon population served.

**Identify Resilience Solutions –** This step is about planning to ensure the facility is prepared to meet the needs it is intended to fulfill. This would address mitigating any flood risk, ensuring resilient power (e.g., solar and storage), discussing staffing, and similar measures. “Resilience solutions” may also include programming such as educational offerings, programs that support social connectedness, and care such as a plan for neighbor wellness checks during emergencies.



**PHASE 3**
**Development of Site, Program, and Operations**

**Develop Site and Install Solutions** – This step includes conducting facility upgrades/resilience retrofits, if applicable. If the resilience hub (or warming or cooling center) is located within a community-based organization’s facility, the municipality may be able to play a key role in securing funding or a portion of funding for designated resilience hubs hosted by community-based organizations.

**Developing an Operations Plan** – Developing an operations plan for the site will support readiness for new and pre-existing sites/community-based organizations to carry out their role within the resilience hubs network – both for emergency situations but also for any ongoing purposes like supporting educational programs. This will include staff/volunteer management, ensuring adequate resources are available to hubs, and outreach so that community members are aware of the available services and sites. See the case study on O’ahu, HI in the “Precedents” section for one example of how a region uses different operating models for its resilience hubs.

**RESOURCES TO GET STARTED**

- **Urban Sustainability Directors Network Guidance on Resilience Hubs** - including [Guide to Developing Resilience Hubs](#) which outlines a phases approach to establishing a resilience hub.
- **Washington DC Community Resilience Hubs Resource** – This resource, developed by Washington DC as part of it’s municipal climate action plan, gives a great overview of the goals and functions of a resilience hub network.
- **Community Cooling Center Guidance** – Guidance from the Maine Emergency Management Agency on implementing cooling centers.

**PRECEDENTS**

- **“Resilience Hubs Can Help Communities Thrive”** – an article by Pew Charitable Trusts that highlights work in Baltimore and Minneapolis to build out resilience hubs and demonstrates the adaptability of resilience hubs to look and operate differently based on the community’s needs.
- **Baltimore, MD** has been working with a network of existing community-based organizations to coordinate efforts, share resources, and build the capacity of the organizations as part of a resilience hub network.
- **Minneapolis, MN** has been working to build resilience at “mobility hubs,” key public spaces where people come to access transportation modes.
- **Medford, MA** completed this preliminary assessment to identify goals and suitable sites for resilience hubs. The City has since developed an onboarding tool and operations plan for the resilience hub network.
- **O’ahu, HI** has established a network of resilience hubs in urban and rural parts of the island. They offer examples of different types of operations for “blue sky” and “gray sky” scenarios as well as levels of services offered.
- **This Climate One podcast** profiles examples of communities taking action toward climate resilience, including mutual aid and resilience hubs.

**COST CONSIDERATIONS**

- The initial assessment and planning effort may cost \$50,000 - \$150,000 depending upon scope and assuming a planning consultant is engaged to facilitate the process.
- Subsequent implementation steps can vary widely. For example, funding a part-time coordinator to plan programming and manage communications for the region’s Resilient Hub Network could be less than \$50,000 per year but identifying sustained funding would be important. Whereas adding air conditioning to a school may be a one-time cost in the hundreds of thousands of dollars.

**POTENTIAL SOURCES FOR FUNDING**

- **Community Change Grants** - EPA funding for community-based organizations (in partnership with Tribes, local governments, and/or higher education) for environmental justice and climate justice activities. Resilience hubs are identified as an eligible activity.
- **Community Development Block Grant** - assists units of local government in various community projects in areas ranging from infrastructure, housing, downtown revitalization to public facilities and economic development.
- **Efficiency Maine Municipal Electrification Retrofits - (eligible communities:** Brewer, Hampden, Hermon, Old Town)
- **Federal Clean Energy and Climate Funding** - includes several Infrastructure Investment and Jobs Act funding programs, including the Energy Efficiency and Conservation Block Grant.
- **Community Services Block Grant** - Grant recipients and Community Action Agencies can leverage funding to support activities to mitigate heat stress including, but not limited to, establishing neighborhood cooling centers and transporting people to cooling centers.
- **AARP Community Challenge Grant** - The program is intended to help communities make immediate improvements and jump-start long-term progress in support of residents of all ages.
- **Private Foundations**, such as the [Maine Community Foundation](#) and others, can provide support for various climate, community, equity, and related initiatives.



# CLIMATE ACTION TOOLKIT #10

## Strengthen Local and Regional Food Resilience



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### Description of the Action

Agriculture, which is highly dependent on climate, is expected to face many impacts as a result of changing weather patterns and more frequent and intense weather events (like heat waves, droughts, hard freezes, and severe storms). It will become more difficult to grow crops and raise animals, and will also become more likely that we experience significant food delivery interruptions. Both of these could lead to price spikes that will be especially challenging for those already struggling to acquire affordable, fresh, nutritious, locally-sourced, and/or culturally appropriate food.

Research conducted while developing Penobscot Climate Action has revealed that while there are a great many organizations addressing food insecurity, questions remain. Namely, what is the state of the food system in the Penobscot Climate Action region? And how can the efforts of existing entities be combined for maximum impact?

In co-developing these climate action strategies with the community, it became clear to the Penobscot Climate Action team that municipalities and organizations did not have access to the data they need to meet the needs of community members (food insecure populations and otherwise). Therefore, with the overarching goal of creating a **stronger, more resilient food system** – one that can withstand shocks like crop damage and supply chain disruptions – this toolkit recommends that municipalities take two key actions:

1. Conduct individual food security assessments and generate corresponding food action plans; and
2. Form a regional Collaborative dedicated to regional food system improvements.

Further actions can stem from the results of the municipal-scale assessments/action plans and the synergism generated by the Collaborative, such as more effectively matching food producers to organizations that distribute to food insecure populations, and increasing the prevalence of home-grown and community-grown products, thereby expanding community food options.

### Steps for Implementation

**Note:** It's envisioned that the two components could occur in sequence. Firstly, a small project team from each individual municipality could be formed to lead the Food Security Assessment and Food Action Plan stage. Then, given the results, the Collaborative could be formed. Finally, the first round of goals set by the Collaborative could be determined from the results of the Assessments and Action Plans.

#### COMPONENT 1

#### Municipal-Scale Food Security Assessments and Food Action Plans

This component involves an assessment of where food is already being grown, where there is potential to expand local food production, and where there are opportunities

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

- ★ **Equity and Environmental Justice.** This action is guided by an overarching goal of ensuring access to affordable, fresh, nutritious, locally-produced, culturally appropriate food for everyone living in the Penobscot Climate Action region and beyond. This action stems from the awareness that those facing financial insecurity and food insecurity often experience concurrent challenges – for example, households that spend over 30% of their income on rents or mortgages are more likely to experience food insecurity and are more likely to be impacted by climate change.
- ★ **Environmental Health.** Increasing local food production, particularly through restorative and regenerative agricultural practices, increases environmental health (such as soil health and air quality) and decreases environmental impacts (such as air pollution from transportation emissions).
- ★ **Community Resilience.** Increasing locally-produced food increases community resilience by providing local food alternatives in the case of supply chain disruptions. Community gardens and agriculture can also provide many resilience co-benefits, including an increase in green space, increase in access to healthy foods, and increase in economic opportunities.
- ★ **Regional Collaboration.** This action aims to build more effective communication and increased impact on the part of food system entities in the region. In this way, entities can share best practices, increase visibility, combine labor forces, and benefit from economies of scale, among other outcomes.

to connect food producers with people experiencing food insecurity – all of which would increase availability of data and understanding of food systems across the region. First steps would include:

**Form a project team** – Form a project team made up of representatives from various sectors, including municipal staff, educational partners, local institutions, relevant businesses, and non-profit organizations and/or community groups, including food banks, farmers’ cooperatives, mutual aid groups, and local land trusts. Ensure your group is

#### KEY PARTNERS

- **Academic food system partners** (e.g., University of Maine Cooperative Extension)
- **Community-based organization food system partners** (e.g., Food and Medicine, Penquis, community gardens, food banks and mutual aid groups)
- **Local institutions** (e.g., colleges and universities, K-12 schools, hospitals and healthcare centers, assisted living facilities)
- **Local agricultural sector** (e.g., farmers, growers, processors, distributors)
- **Local food processing and distribution** (e.g., processors, distributors, storage, grocery retailers)
- **Local governments**
- **Regional organizations** (e.g., Eastern Maine Development Corporation)
- **State agencies and programs** (e.g., Department of Agriculture, Conservation, and Forestry; Maine Climate Council)
- **Statewide nonprofits, networks, and initiatives** (e.g., The Maine Food Strategy, GrowSmart Maine, Mainers Feeding Mainers, Full Plates Full Potential)
- **New England initiatives** (e.g., Food Solutions New England, New England Food Systems Planners Partnership)

reflective of diverse perspectives and experiences from your community – such as age, income, race, gender identity, religion, immigration, and language.

**Assess vulnerability and assets through a data-driven analysis** – Identify community food resources, populations that are experiencing food insecurity, and communities or neighborhoods that could benefit most greatly from expanded access to food resources. Additionally, identify potential regional partners that could provide expertise and resources. **Key indicators of food justice** from other sources, such as the U.S. Census Bureau and other national and local data sources, may include the following:

- Food retail options
- Emergency food providers
- Community garden plots
- Participation in the National School Lunch Program
- Food access points that offer culturally relevant food options (and which cultures are represented)
- Number of persons participating in Supplemental Nutrition Assistance Program (SNAP, formerly food stamps)
- Accessibility of grocery stores/food pantries/etc. (food access points) by set walking distance, driving distance, or by public transportation

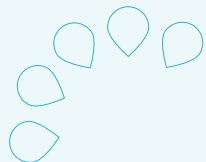
**Corroborate, qualify, or expand on findings with community input** – Leave space for qualitative reporting and first-hand perspectives. Supplement the information gathered in step two with community input. This engagement should include community members, including Environmental Justice and other priority populations, organizations that serve the community, and other social networks and community leaders. Utilize multiple engagement strategies, such as participation in community events, leading workshops with community-based organizations, surveys, and storytelling events. Document

## Connections Across Existing Work and Other Climate Action Strategies

This action begins with municipal-scale assessments that would provide the data needed to most effectively address existing and projected food insecurity in the region in order to build a resilient food system. The **Maine Road Map to End Hunger** envisions little to no food insecurity and its associated trade-offs – like “skipping meals to pay for housing, medicine, or heat, or staying in an unsafe relationship because leaving jeopardizes [one’s] ability to keep food on the table for [their] children.” The Road Map also notes that assessments can be used to identify numerous data points, including the following: gaps in federal assistance programs and how to meet them through state and local resources; the relationship between food insecurity and factors like age and/or race/ethnicity; barriers to employment; etc. Expanded use of technology and better data sharing models will also benefit others located within and beyond the Penobscot Climate Action region.

Additionally, this action could bring together the work being done by individual entities in the region for maximum impact through the implementation of a Collaborative dedicated to increasing food resilience in the Penobscot Climate Action region. For example, there are many programs and offerings provided by the University of Maine Cooperative Extension that could be further amplified through partnerships with food aid organizations, schools, and other institutions.

This action also connects to the Community Hubs for Resilience (Toolkit #9), as education and resources related to food security could be part of the service offerings of the network.



the experiences and recommendations that community members provide.

**Develop a food action plan** – Informed by the results of the food assessment, identify the major vulnerabilities, assets, and goals for the municipality in the form of a Food Action Plan. The plan should be specific to the municipalities’ needs and outline the goals and recommendations that would prioritize community needs. Food Action Plans often aim for the following types of goals: to increase production, sales, and consumption of locally-produced food; to create jobs and improve economic opportunities in food and farming; to protect the land and water needed to produce food; to ensure food safety; and to reduce waste, hunger, and food insecurity.

## COMPONENT 2

### Regional-Scale Penobscot Climate Action Food System Collaborative

This component focuses on building food resilience through enhancing regional coordination and support for local farmers, gardeners, food distributors, institutions, and residents. [Research conducted by The Maine Food Strategy](#) has shown that networks allow groups to organize effectively, advance policies, and maximize programs, resources, and opportunities. First steps would include:

#### Identify a “host organization” for the Collaborative

– The Climate Action Committee will identify a host organization for the Food System Collaborative, that would be responsible for convening and coordinating efforts within the Collaborative. The host organization may be a community nonprofit, a regional organization, an academic center, or another entity that works in the food system space and that has the capacity to facilitate this initiative. The Climate Action Committee would work with the host organization to support the toolkit vision and identify pathways for funding.

**Conduct outreach and conversations** – Conduct outreach and hold conversations with key stakeholders in the region, focusing on priorities, needs, and vision for a resilient food system. Discuss the concept and intent behind a regional Collaborative for Greater Bangor, and gather perspectives on potential opportunities, value, or impact that could be created through coordination. The goal of these conversations is both to coalesce around common themes for building food system resilience, to build relationships within the food system space, and to invite interested stakeholders to join in forming the Collaborative. Continue to expand outreach based on recommendations and introductions from initial conversations.

**Launch the Collaborative** – Launch the Collaborative for the Greater Bangor region. Set the first round of goals and objectives, based on the results of the Food Security Assessments and Food Action Plans of each municipality, as well as any new insight that emerged through preliminary conversations. As a starting point, existing priorities, as identified by Penobscot Climate Action, include the following:

- Create a plan for how to help the community get food during supply-chain emergencies and climate emergencies;
- More effectively match food producers to organizations that distribute to food insecure populations;
- More effectively match local growers, distributors, and other entities with financing models and grants that remove barriers to food generation and food access;
- Increase production and distribution of fresh and local food products;
- Increase prevalence of self-reliance via home-grown and community-grown products;
- Increase availability of food systems jobs, especially in food preparation, as fresh food preparation requires more labor;

## PRECEDENTS

### Food Assessments and Action Plans

- [Central Region, New York](#)
- [Burlington, Vermont](#)

### Food Action Plans

- [Lewiston-Auburn, Maine](#)
- [Unity, Maine](#)
- [Manchester, New Hampshire](#)
- [State of Massachusetts](#)
- [Cambridge, Massachusetts](#)
- [State of Vermont](#)

### Regional Food System Collaboratives

- [Good Shepherd Food Bank](#) - based in Auburn, Maine, works closely with over 600 partner agencies. In one partnership with the Preble Street Food Program, both worked with other organizations to establish a **‘Food Security Hub’** that will be capable of serving 10,000 meals per day. The Good Shepherd Food Bank collaborative model demonstrates the impact of working with a **range of partners**, including local small businesses like insurance companies and breweries; big-box consumer goods stores like Walmart and BJ’s; smaller groceries like Shaw’s and Hannaford; private companies like Bank of America and Poland Spring; and local non-profits; among others. Good Shepard Food Bank also has an [Advocacy Advisory Council](#), which meets regularly to identify, then advance advocacy priorities (like focusing on culturally-specific food projects and working with schools with large populations of students on free- and reduced-lunch programs).
- [Cultivating Community](#) - based in Portland, Maine, focuses on urban gardens, community gardens, and school gardens, as well as education for new leaders and farmers.
- [Focus on Agriculture in Rural Maine Schools \(FARMS\)](#) - brings educational programs, local food, and garden-based curricula to school cafeterias.
- [The Maine Grain Alliance](#) - promotes the production and use of locally-grown grains through annual conferences and celebrations where members can share knowledge and best practices.



- Design and propose zoning ordinances that promote, rather than restrict, small-scale agricultural uses;
- Design and propose zoning ordinances that conserve existing agricultural lands; and
- Establish a community entity that processes and packages local food products for distribution to institutions and community members.

**Establish governance systems** – Outline how the Collaborative will work together, including roles and responsibilities, frequency of meetings, and systems for collaborating. Identify ways in which the regional

#### PRECEDENTS (continued)

- **The Merrymeeting Food Council** - is a collaborative of farms, fisheries, businesses, nonprofits, government, and individuals from 14 communities around Merrymeeting Bay, Maine. The Merrymeeting Food Council, among others including Food and Medicine, participate in the [Maine Network of Community Food Councils](#). Many other participating organizations serve numerous towns including rural areas: Good Food Council of Greater Lewiston-Auburn, Local Food Connection of Greater Bethel, and Knox County Food Council of Knox County.
- **Intervale Center** - in Burlington, Vermont is an “ecosystem of farms, community gardens, programs, and recreational spaces.” In 2022, Intervale distributed 12,600 pounds of produce in their Free CSA Program, completed three pollinator projects, and held 27 educational workshops, among other actions and accomplishments. The Intervale Center works closely with [AALV](#), a Vermont-based social services organization dedicated to supporting New Americans and refugees in Vermont, including Bhutanese, Burmese, and Iraqi populations.
- **Center for Agricultural Economy in Vermont** - a good example of a regional body that coordinates and supports a robust food system in Vermont’s Northeast Kingdom. They have various case studies on food processing models and food distributions models.

Collaborative will connect with and/or align with other networks coordinating around food system resilience either in different geographies or broader scales (e.g., The Maine Food Strategy, Food Solutions New England, Maine Network of Community Food Councils, UMaine Cooperative Extension, etc.). Create systems for regularly reflecting on progress, and adapting approaches based on learnings.

#### COST CONSIDERATIONS

- The initial assessment efforts may cost \$50,000 - \$150,000, per municipality, depending upon scope and assuming a planning consultant is engaged to facilitate the process. Subsequent implementation steps can vary widely, depending on the goals of the Collaborative.

#### POTENTIAL SOURCES FOR FUNDING

- **USDA Regional Food System Partnership Grants** - supports partnerships that connect public and private resources to plan and develop local or regional food systems. Funding ranges from \$100,000 to \$1,000,000.
- **USDA Community Food Projects Competitive Grant Program** - supports partnerships and initiatives to meet community food needs related to expanding local food, food access, agriculture, or nutrition challenges.
- **USDA Resilient Food Systems Infrastructure Program** - supports building resilience in supply chains, such as expanding markets to small farms and food businesses.
- **Maine Community Resilience Partnership Grants** – Funding for climate mitigation and adaptation efforts, including capacity building, planning, and implementation projects.
- **Private Foundations**, such as the [Maine Community Foundation](#) and the [New England Food System Resilience Fund](#), can provide support for various climate, community, equity, and related initiatives.

#### RESOURCES TO GET STARTED

- **The USDA** provides resources around conducting [Food Security Assessments](#), such that one could be created for the region with sub-reports for individual municipalities and/or organizations, such as [this one](#) from [Durham, NC](#).
- **What Maine’s Food System Needs Now** - Findings from a study by the [Maine Food Strategy](#) that outlines key recommendations for strengthening Maine’s food systems, with a focus on leadership and strategy.
- **The Maine Food Strategy Framework** - A framework (or organizing tool) produced by the Maine Food Strategy designed to help organizations collaborate across sectors to strengthen Maine’s food systems.
- **Everyone at the Table: Maine’s Roadmap to End Hunger by 2030** - Maine’s plan to end hunger, produced by the Department of Agriculture, Conservation, and Forestry.
- **Food Resilience: A Planning Guide for Local Governments** - This resource, produced by the John Hopkins Center for a Livable Future, guides local governments in building food system resilience in a way that promotes equitable and just food systems.
- **Food Solutions New England** - aggregates a wealth of resources related to building resilient food systems, including [A New England Food Vision](#), a strategic vision for strengthening food systems in New England.
- **New England Food System Planning Partnership** - aggregates a wealth of research and initiatives tied to strengthening food system resilience, including a Food Systems Resilience Assessment Tool that is currently under development (as of January 2024).
- **Sustainable CT** provides a repository of actions that can be conducted by collaboratives and partnerships (see 10.1 – Encourage an Equitable and Just Food System & 10.5 – Support Equitable Food Access and Local Farmers & 10.4 – Develop and Promote Community Growing Spaces).