



KITTERY: CLIMATE ACTION PLAN

MAY 2024



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PREFACE



ACKNOWLEDGMENTS

Kittery City Council

Judy Spiller, Chair
Colin McGuire, Vice Chair
Celestyne Bragg
Cyrus Clark
George Dow, IV
Cameron Hamm
Mary Gibbons Stevens

Municipal Staff

Kendra Amaral, Town Manager
Kathy Connor, Project Planner
Max Zakain, Town Planner
Suzanne Esposito, Communications Director
Haley Mock, Executive Assistant to the Town Manager

Partner Organizations

Office of Local Defense Community Cooperation
Southern Maine Planning and Development Commission
Portsmouth Naval Shipyard
Kittery Climate Action Now (KCAN)
Governor's Office of Policy, Innovation, and Future

Kittery Climate Task Force

Cameron Wake, Chairperson
Judy Spiller, Vice Chairperson, Town Council
Celestyne Bragg, Town Council
Frances Burke, Traip Academy, Student
Nanci Lovett, Conservation Commission
Dutch Dunkelberger, Planning Board
Robert McDonough, Parks Commission
Ken Fellows, Citizen At Large
David Gibson, Citizen At Large
Erin Kempster, Citizen At Large
Roland Scott, Citizen At Large
Thomas Morely, Portsmouth Naval Shipyard
Kendra Amaral, Town Manager
Kathy Connor, Project Planner

Consultants

Zoe Miller Strategies, Portland, Maine
Morris Communications, Kennebunkport, Maine
ICLEI – Local Governments for Sustainability USA, Denver, Colorado

Cohort Communities

Town of Biddeford
Town of Kennebunk
Town of Kennebunkport

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LETTER FROM THE TOWN COUNCIL CHAIR



Town of Kittery
200 Rogers Road, Kittery, ME 03904
Visit us: www.kitteryme.gov

February 26, 2024

The Kittery Town Council formed the Climate Adaptation Committee in 2019. At that time, it determined it was important to build resilience to warming temperatures and rising seas and cutting emissions of climate-warming gasses in Kittery. It now recognizes that building that resilience is critical to the Town's future.

Council subsequently charged the Committee, serving as a Climate Action Task Force, to prepare a Climate Action Plan. The Task Force developed 29 Climate Action Strategies as the core of that plan. Town Council unanimously adopted those strategies in December 2023. The strategies provide clear and actionable steps for Kittery to follow in responding to our rapidly changing climate.

We strongly endorse this Climate Action Plan, supporting those strategies. We ask that all Town departments (municipal and school); residents – young and old; businesses; and others act now to implement the Plan and make Kittery more resilient, energy efficient, and sustainable.

Damage from the January 2024 storms – flooding and storm related damage to key Town roads, homes, businesses, the working waterfront, and our cherished Fort Foster – adds urgency to Plan implementation to protect the long-term well-being of our community.

On behalf of the Kittery Town Council,

Judy Spiller
Chair

LETTER FROM THE PORTSMOUTH NAVAL SHIPYARD



DEPARTMENT OF THE NAVY
PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, N. H. 03804-5000

IN REPLY REFER TO:
4101
Ser 100/092
April 10, 2024

Judy Spiller
Kittery Town Council
Town of Kittery
200 Rogers Rd
Kittery, Maine 03904

Dear Chair Spiller:

SUBJECT: KITTERY CLIMATE ACTION PLAN

Portsmouth Naval Shipyard is pleased to have supported Kittery's Climate Action Plan (CAP) development. The Shipyard has been engaged throughout the development of the CAP through attendance at monthly Task Force meetings, participation in the community conversations, and a brief to the Committee Chairs and Town Manager on Installation climate resilience and energy efficiency. We appreciate the opportunity to have been involved in the Town's process and to provide details on our Installation's efforts.

Climate change is among the most pressing challenges facing our Nation and the Navy. We are committed to collaborating with our community partners to increase the scale and scope of mitigation and adaptation efforts.

We recognize that Navy Installation resilience does not start or end at the island's edge and that partnerships with the State and our local communities are pivotal to increasing our collective resilience. We look forward to partnering on resiliency and emissions reduction projects to address shared vulnerabilities and cut climate-warming emissions in alignment with State, local, and Federal goals.

For questions related to this letter, please contact the Installation's Community Plans and Liaison Officer, Thomas Morley, at thomas.f.morley.civ@us.navy.mil or 207-438-6965.

M. C. OBERDORF

EXECUTIVE SUMMARY

Just as weather and climate are changing globally, so too the climate and weather in Kittery are changing. The summers are hotter. Gulf of Maine sea temperatures are record-breaking. The winters are warmer with less snow. And periods of drought follow times of frequent, intense rainstorms. In January 2024, Kittery experienced two successive devastating coastal storms. These storms flooded roads and residences, undermined parts of the Pepperrell Cove pier, and ate away at Fort Foster and Seapoint and Crescent beaches.

How Kittery responds right now to the changing climate will shape how Kittery's community members, their children and grandchildren experience Kittery this year, next year, and for decades to come.

These changes are driven by the burning of fossil fuels. Heat-trapping gases from burning of coal, oil, and natural gas are increasing temperatures at an unprecedented rate, and those increasing temperatures are raising sea levels and changing weather patterns. Humanity needs to achieve net-zero global greenhouse gas (GHG) emissions by 2050 to keep global warming to less than 2.7 degrees Fahrenheit and prevent catastrophic climate impacts.

Kittery can play its part in reducing emissions. Kittery's Climate Action Plan sets a 2030 reduction target of 40% below its 2019 level and aspires to net zero emissions by 2050. These targets do not include the Portsmouth Naval Shipyard, which is meeting its own US Department of Navy goals. These emission goals do comply with the 2020 State of Maine climate action plan, **Maine Won't Wait**.

Even with emissions reductions, some climate change impacts are already locked in. Intense summer droughts followed by equally intense rainstorms will compromise wells and flood septic systems. Continued sea-level rise combined with storm surge from coastal storms will erode Kittery's dry beach areas, and damage infrastructure (buildings, roads, piers, and subsurface utilities), raising municipal costs. Loss of high value coastal homes will reduce the tax base. Warming in the Gulf of Maine will continue to affect traditional fisheries. Hotter summers mean more vector-borne diseases like Lyme. Extreme heat and worsening air quality will affect the young, the old, the chronically ill, and those with limited resources.

Kittery's Climate Action Plan is a roadmap for Kittery to reduce emissions and become more resilient to climate impacts. It outlines 29 strategies that are aligned with what Kittery residents have shared. The Climate Action Plan focuses on three priorities:



Resiliency - The ability to prepare, withstand, and recover



Electrification - Replacing a carbon fuel economy with clean energy



Energy efficiency - Energy saving and reducing waste

The CAP strategies also consider equity (distributing costs and benefits fairly and minimizing harm to vulnerable groups - and wider co-benefits) broader benefits for health, social wellbeing, the environment, and the economy.

The CAP strategies and action items are organized into five focus areas:



Land Use and Natural Environment



Health, Safety and Well-being



Building and Energy Efficiency



Transportation, Roads, and Utilities



Leadership and Capacity



Kittery's CAP builds off community concerns. Outreach to almost thirty community groups revealed a deep interest in the Town acting decisively on climate issues and providing guidance to community members. Of particular importance to community members were the following:

- Impacts on valued natural areas such as Fort Foster, Seapoint and Crescent beaches, and Spruce Creek.
- Desire for a less car-dependent community with more public transit and growth in the network of walking and bicycling of paths.
- Development of affordable housing near transportation hubs with a robust public transportation system.
- Sustainable development and renewable energy use.
- Preservation and enhancement of Kittery's working waterfront.

Kittery's GHG emissions reduction goals are achievable. Modeling of community-wide GHG emissions now and in the future reveals how the Town can meet its GHG emissions reduction goals. The greatest reduction in GHGs by community actions are projected to come from three categories:

1. Transportation - Emissions reductions from expanding public transportation systems, promoting home construction in areas near critical services, improving walking and biking infrastructure, and supporting the adoption of electric vehicles.
2. Commercial energy consumption - Emissions reductions from installing energy efficiency upgrades, air source heat pumps, and solar panels.
3. Residential energy consumption - Emissions reductions from installing energy efficiency upgrades, air source heat pumps, and solar panels.

The Climate Action Plan Task Force thanks all the Kittery community members who took time to provide input and feedback for the Climate Action Plan. That engagement has made this plan much stronger and more relevant for Kittery's community. By working together to implement these 29 strategies, the Town's community members can build a more vibrant, equitable, climate resilient, and low carbon Kittery, now and into the future.

LAND USE & NATURAL ENVIRONMENT

Helping our environment respond to climate change.

1. Direct growth to areas with existing infrastructure and low flood risk

- Implement coastal flood hazard ordinance.
- Refine ordinance to allow increased density in areas with sewer, water, energy transmission, public transit, and other amenities.
- Identify long-term strategies to reclaim coastal land for resiliency and public access.

2. Advance use of Low Impact Development practices

- Refine Low Impact Development (LID) ordinance to:
- Allow and promote reduction and/or alternatives to impervious surfaces and stormwater runoff to limit groundwater rise and erosion.
 - Require limit on soil disturbance.
 - Require preservation and maintenance of natural landscapes with native vegetation.
 - Allow and promote nature-based stormwater solutions.



3. Preserve and protect natural areas and local farms/food producers

- Expand protection and preservation of critical ecosystems such as salt and freshwater marshes.
- Direct development away from flood-prone areas.
- Monitor and enforce shoreland buffer modifications.
- Refine subdivision ordinance to require more open space in zones with no public utilities.
- Add seasonal farmstand definition to ordinance and remove regulatory barriers for establishing seasonal farmstands.

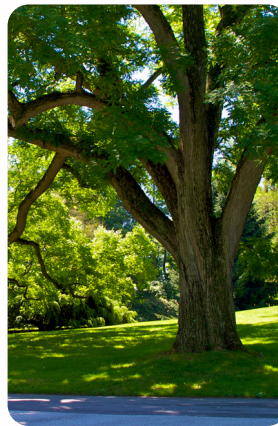


4. Limit use of fertilizers, pesticides, and herbicides

- Advocate for statewide limits on residential use of fertilizers, pesticides, and herbicides, particularly in shoreland areas.
- Amend ordinances to require more climate resilient landscaping.

5. Preserve and revitalize working waterfronts

- Adopt policies and ordinances that limit or remove barriers to access to coastal areas and working waterfront.
- Promote access to the fishing, landing, and processing of sustainable food sources from the waterfront, and encourage development of new/emerging fisheries and aquaculture.
- Support infrastructure at dock and marine facilities to enable electric fleets.
- Support the development of aquaculture.
- Permit only water-dependent uses along the shore.
- Require future coastal development/redevelopment to be climate/flood resilient and energy-efficient.



6. Maintain and increase tree cover and access to shade

- Develop a Town-wide tree program to encourage protection and planting of climate-resilient trees.
- Inventory heat islands, street trees, and shade areas, and develop a plan to plant more trees and install shade areas.

HEALTH, SAFETY & WELL-BEING

Increasing health, safety, & well-being as the climate changes.



7. Provide advisories on health impacts of climate and extreme weather events



- Develop and implement communication strategies for public health advisories about climate-related health risks.
- Develop a plan for "Resilience Hubs" that can provide critical services during a disruption or health event.

8. Enhance planning for disaster response and mitigation for current and emerging climate hazards



- Develop town-level plans for climate hazards including loss of electrical service, extreme precipitation and flooding, extreme temperatures, wildfires, and drought.
- Create a coordinated climate and health response team to address disasters and establish a network for pre- and post-event coordination.
- Enhance collaboration with York County Emergency Management Agency on hazard mitigation planning.

9. Assess potential impacts of groundwater rise on septic systems and wells



Advocate for a regional groundwater modeling effort to identify areas of risk for groundwater rise and saltwater intrusion.



10. Provide education on public health impacts of climate change



- Implement community and school-based programs to educate the community about public health impacts – including vector-borne diseases, low air-quality days, and heat-related illness.
- Ensure education includes additional information-sharing methods for contacting "harder-to-reach" audiences (e.g. vulnerable populations, seasonal workers).

11. Evaluate and update evacuation routes to reflect current and future flood risk areas



Review and update evacuation routes, along with the signage and maps that direct people away from flood hazard areas.



BUILDING & ENERGY EFFICIENCY

Making our buildings and energy systems resilient to climate change.

12. Increase efficiency in public and private buildings



- Support weatherization outreach programs that provide resources and information on efficiency evaluation, Efficiency Maine incentives, contractors, and financing options.
- Create incentives to build energy efficient affordable housing within Town.
- Support the adoption of higher efficiency building codes at a regional level.
- Support monitoring of energy efficiency in municipal and school facilities – along with planning for additional efficiency measures.



13. Support efforts by Efficiency Maine to transition single family homes and other buildings to heat pumps



- Support usage of state and federal heat pump adoption programs for single family homes.
- Support current town plans to transition more municipal buildings to heat pumps. Encourage the school system to consider opportunities to transition to heat pumps.

14. Encourage distributed renewable energy



- Support community solarization programs that provide resources and information on solar evaluation, Efficiency Maine incentives, contractors, and financing options.
- Actively engage in discussions of off-shore wind and other renewable sources at the regional level.
- Continue to evaluate municipal and school property for renewable energy opportunities.

15. Support improved grid resilience



Support regional-level planning in cooperation with utilities to ensure a strong grid in the transition to greater electric dependency and for all potential crises.



16. Promote resilient building designs



- Encourage that building designs and modifications that consider both current and potential future hazards from climate change.
- Ensure critical facilities consider climate-related weather risks in both location and design and ensure they have plans for resiliency.
- Promote reuse or rehabilitation of buildings and homes.



17. Promote hazard disclosure for property transactions



Encourage the State to require flood risk disclosures for all property transactions.



TRANSPORTATION, ROADS & UTILITIES

Making our transportation systems and infrastructure ready for climate change.

18. Expand access to and use of public transportation services

Mount a concerted regional effort towards expansion of public transportation throughout southern Maine.

19. Direct development to areas of town with public utilities, public transportation and essential services

- Modify land use codes to promote infill development.
- Redevelop brownfield sites to increase housing stock.

20. Improve bikeability and walkability

Improve and expand the walkability and bikeability of our roadways with safe, comfortable, and convenient paths, sidewalks, and bikeways.



21. Reduce paved areas in new development and redevelopment projects

- Review and amend parking ordinances to reduce minimum requirements and build in flexibility.
- Review and update minimum parking space dimensions and parking lot design, including compact car spaces where appropriate.



22. Expand electric vehicle charging on public and private land

- Expand public EV charging locations through public/private partnerships – including in existing publicly-accessible but privately-owned lots and on the waterfront and wharfs.
- Require EV chargers or EV-ready parking in new development and redevelopment projects.

23. Increase public and private use of electric vehicles

- Transition municipal, school, and public transit fleets to EVs.
- Ensure the public has user-friendly information and resources to encourage and assist with purchasing EVs.
- Continue to push for EV charging stations along state/interstate highways as well as locally.

24. Protect critical water-related infrastructure

Assess and protect critical assets such as drinking water, wastewater and stormwater management infrastructure that will be impacted by sea level rise, storm surge, flooding and extreme weather events associated with climate change.

25. Assess vulnerability and improve resilience of transportation infrastructure

- Assess impacts of heat, groundwater and sea level rise on local transportation infrastructure (roads, culverts and bridges) to understand vulnerabilities.
- Plan and conduct appropriate upgrades such as raising or relocation of transportation infrastructure.
- Amend road design standards to include climate resilience.
- Adopt a policy stating the Town will only consider adopting roads that meet updated standards.



LEADERSHIP & CAPACITY

Fostering leadership and support to implement our Climate Action Plan.



26. Ensure municipal decision-making and funding strategies considers resilience and sustainability



- Adopt protocols to account for environmental conditions of today and tomorrow in municipal decision-making.
- Include funding for resilience and sustainability infrastructure investments in annual budgets and capital plans. Provide ongoing funding for staff to plan and implement projects.

27. Grow municipal capacity to support and implement climate adaptation strategies



Provide town departments with the resources, space, staff, and training needed to identify, evaluate, plan, and implement adaptation approaches.

28. Engage the community, schools, and local businesses in ongoing sustainability and resilience efforts



- Encourage more residents and local companies to take action in their own homes and businesses by providing support, education, and programs.
- Maximize composting of organic material, recycling and reuse, and reduce the use of single-use plastic in Town operations.



29. Advocate for resiliency and sustainability education at the state level



- Ensure incorporation of climate change and resiliency into core and project-based learning requirements.
- Provide opportunities for sharing information, successes, and lessons learned throughout the region and state.



INTRODUCTION AND BACKGROUND



CLIMATE ACTION PLAN OVERVIEW

A Climate Action Plan (CAP) is a strategic plan for reducing a community's greenhouse gas (GHG) emissions and adapting and responding to the impacts of climate change. CAPs include an *inventory* of the municipality's current GHG emissions and existing vulnerabilities, *goals* for emissions reductions and climate adaptation, and *actions* to achieve those goals.

This CAP serves as a roadmap to ensure Kittery's climate ready future.



Emissions reductions – Actions that help reduce the total amount of GHGs in the earth's atmosphere. These actions put the brakes on the speed at which climate change is happening.



Climate adaptation – Actions taken to strengthen a community's ability to adjust to climate change and thrive in spite of its impacts. Adaptation softens the blow of climate change.



The failure to act against the effects of climate change carries a great risk for Maine, as doing nothing will cause costly damage to Maine's buildings and infrastructure, vulnerable ecosystems, iconic species, & public health.

– *Maine Won't Wait, State of Maine's 2020 Climate Action Plan*



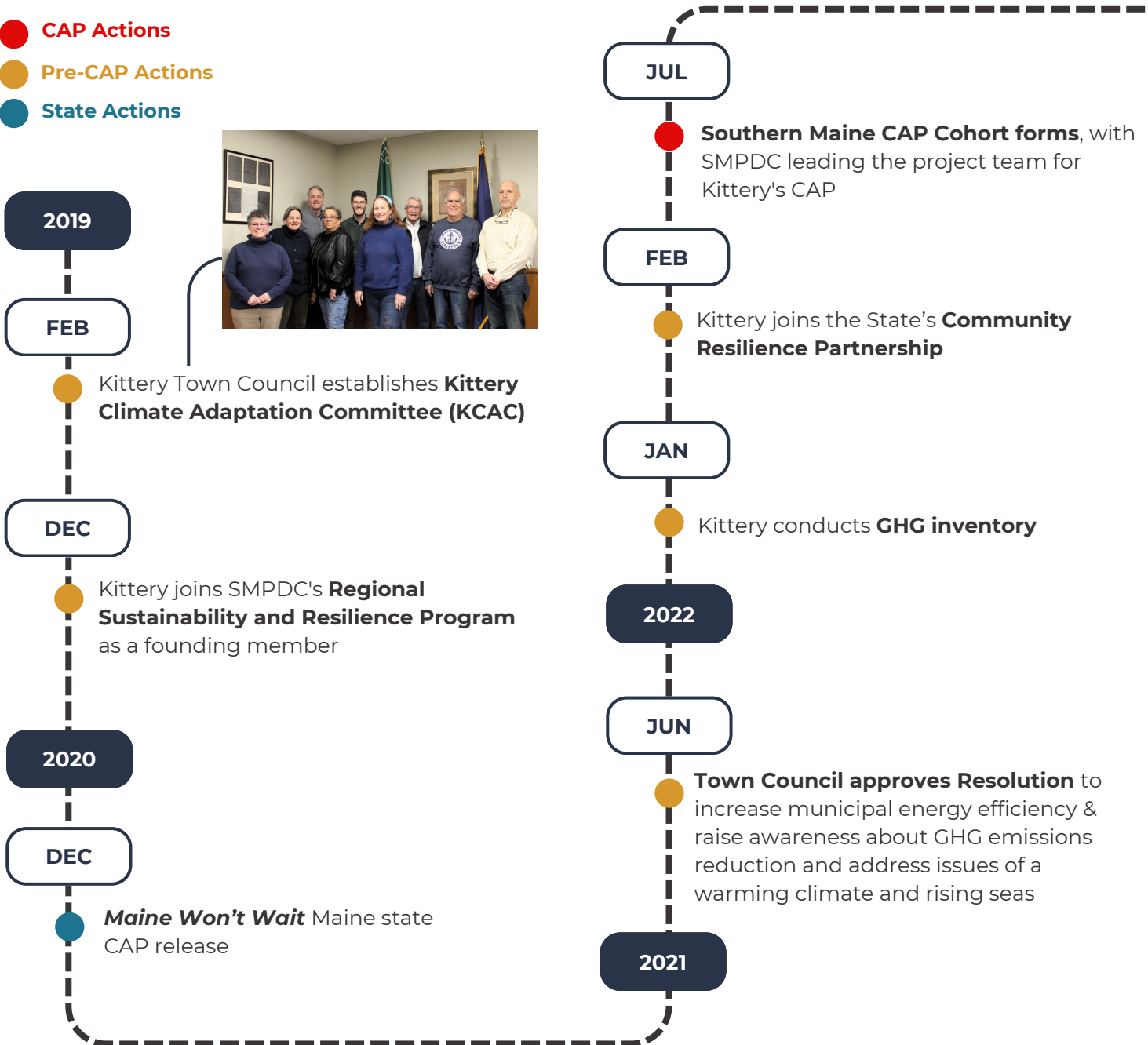
CLIMATE ACTION PLANNING TIMELINE

In 2019, the Town Council established the Kittery Climate Adaptation Committee (KCAC) to advance the Town's climate change resilience efforts. It sparked a multi-year effort to create Kittery's Climate Action Plan, led by the Climate Action Plan Taskforce, which includes members of the KCAC, Town staff, and community members.

Kittery's climate action planning efforts were perfectly timed to coincide with efforts to plan for climate change by the State of Maine and by neighboring communities. Kittery had the opportunity to join the City of Biddeford and the Towns of Kennebunk and Kennebunkport as part of the Southern Maine Planning and Development Commission (SMPDC) Southern Maine CAP Cohort.

All four Task Forces developed CAPs concurrently. While each set their own priorities and actions, they learned from one another, sharing ideas for actions to include and ways to engage with their communities. They also discussed and agreed upon regional actions to include in their plans and work on together in the future.

- CAP Actions
- Pre-CAP Actions
- State Actions



CLIMATE ACTION PLANNING TIMELINE

SEP

Southern Maine CAP Cohort Kickoff event



Southern Maine CAP Cohort Kickoff Event

2023

JAN

Task Force launches community outreach effort

MAR

Project team creates Draft **Climate Change Vulnerability Assessment**

Town Council and Task Force hold **workshop** to discuss CAP goals

Goal of **climate neutral by 2050; 40% reduction in non-industrial GHG by 2030**

JUN

"There is No Planet B" Community Conversation & Watch Party about Climate Change in Kittery

AUG

Draft **CAP strategies**

2024

DEC

Town Council adopts **CAP strategies**

NOV

Task Force presents finalized CAP strategies to the Town Council and public

SEP

Climate Action Open House and survey for public input on CAP strategies

CAP Implementation

KITTERY'S VISION, PRIORITIES, GOALS & TARGETS

Vision

Kittery desires to **build public knowledge and support for social well-being, inclusive community, and robust ecosystems** throughout Kittery, now and in the future.

Kittery strives to create **reasonable, practical, sustainable planned growth** with the emphasis on maintaining historical settings and open space for protection of natural resources.

Kittery strives to create **sustainable building, infrastructure and resource management practices** reflecting present and future challenges.

Kittery strives to **bring awareness and provide hopeful engagement to the community** to rise and meet these challenges in an adaptive and co-existent manner.



Priorities



Resiliency

Resiliency refers to climate resilience, the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate.



Electrification

Electrification is the switch from fossil fuel energy to clean energy. It involves cleaning up electricity generation by replacing traditional fossil-fuel generation with renewable energy, energy storage systems, and a smart electric grid AND electrifying everything by replacing oil and gas heating systems and vehicles.



Efficiency

Energy Efficiency is using less energy to get the job done, whether for heating homes, powering transportation, or processing waste.

Emissions Reduction Goals and Targets

The sixth assessment report from the Intergovernmental Panel on Climate Change clearly states that globally action now is needed to reduce greenhouse gas emissions 45% by 2030 and achieve net zero emissions by 2050 to keep global warming to less than 1.5 °C.

Keeping in line with national and State of Maine climate goals, Kittery has set the following emissions reduction target and goal:

TARGET

Reduce community-wide greenhouse-gas emissions by 40% below 2019 levels by 2030.

(Not including emissions from the Portsmouth Naval Shipyard)

GOAL

Aspire to achieve net zero-emissions by 2050.

This will require the reduction of carbon dioxide emissions to as close zero as possible with any remaining emissions counterbalanced by natural carbon sinks.

COMMUNITY ENGAGEMENT

Community engagement was critical to the development of this CAP. The Town employed various engagement approaches and activities to educate the community and seek public input, informing the strategies in this plan that will direct Kittery's climate efforts for years to come.

Spring 2023

- Kittery Climate Action Plan webpage published
- **Community Conversations** with community groups, committees, and organizations. Community members were asked:
 - “What do you love about Kittery?”
 - “What worries/concerns you about Kittery now and in the future (given climate change)?”
 - “What does a climate-friendly future for Kittery look like?”
 - What strategies or actions would you like to see in the plan?”

The input received informed the selection of CAP strategies.

Summer 2023

- Community Conversation and Watch Party of **There Is No Planet B**, a presentation about climate change in Kittery.



There is No Planet B Watch Party

Public engagement chapter closes, but the implementation dialogue continues!



Kittery Climate Action Open House

Fall 2023

- **Climate Action Open House:** An open house for community members to preview strategies and collect feedback on the proposed CAP strategies. *This input shaped how the strategies appear in the plan.*
- Kittery Community Market outreach table
- Taste of Kittery outreach table
- Election Day outreach table
- Library outreach table



Members of KCAC tabled on Election Day

WHAT WE HEARD

Climate Concerns



Power grid limitations, high wind impacts from severe storms, and resiliency to meet future needs.
- Town Department Heads



Expect greater erosion and runoff which will increase algae and other waterborne contaminants. - DEI



Increased flooding will impact our streets, homes, businesses, and access.
- Housing Committee



Sick trees, overgrowth, and species changes will increase the risks of major fires. - Kittery Land Trust



Recreation impacts from shoreline damage at Fort Foster and waterfront assets. - Kittery Art Association



High level summer heat will impact the vulnerable without AC. - Footprints Board



Cost of coastal flooding to town.
- Town Council



Property loss will increase from sea level rise and drainage issues.
- Water District



Loss of our wetland habitats from sea level rise and sea warming on lobster fishery. - Shellfish Conservation Committee

Climate Strategy Ideas

Shift electricity to green energy like solar



Actively adapt to climate impacts

Ensure that emergency response is effective and equitable



Create housing that is affordable

Install more EV charging stations

Increase food system resilience

Build a community culture of action and resilience



Create reliable public transportation and more options for walking & biking

Maintain a resilient power grid



PLANNING FOR EQUITABLE CLIMATE ACTION

Kittery recognizes the diversity of its community and acknowledges that not all community members have equal access to services or require the same considerations relative to climate action planning.

Including people of different means, abilities, and perspectives in the climate action planning process helps shape recommended actions to make them achievable and accessible for all community members. Incorporating diverse perspectives ensures that Kittery's strategies account for and respond to the barriers and vulnerabilities faced by some community members. This also reduces the likelihood of unintentional outcomes of strategies that can lead to exacerbating the vulnerabilities and negative climate impacts on various members of the community.

During CAP public engagement, the Town identified climate action barriers for community members:

Financial: Lack of financial resources are a barrier to making resilience and energy efficiency improvements to homes, purchasing electric vehicles and installing at-home charging infrastructure, and accessing typical rebate programs. A lack of affordable housing is an equally important barrier, especially for renters who have limited ability to improve the resiliency and energy efficiency of their rented homes.

Time: Community members may not have the spare time to engage in public events and information sessions or to dedicate to learning more about climate adaptation, waste reduction, energy efficiency or other beneficial programs and services.

Language: Highly technical language, acronyms, or exclusively English text for communications, information materials, and events can prove a barrier for some members of the community including non-native English speakers and English speakers alike.

Access: Without reliable means of transportation or technology connections, members of the community are limited in their ability to access site specific services and programs, online resources, and other support.

Health: Those who are chronically ill or who struggle with personal energy limits or mental health challenges are less likely to have the ability or means to devote finite "human energy" to plan and implement efficiency, electrification, and sustainability measures in their lives.

Transient vs. Permanent Residence: Some community members are temporarily stationed, assigned, or living in Kittery, limiting their connection to neighbors and the Town, and impacting their understanding of how to access information about programs and services offered in the community.

By recognizing the barriers faced by the broader community, the Climate Action Plan implementation can focus on equitable solutions that adapt and reflect the needs of the broader community in a welcoming and inclusive manner. The anticipated outcomes are a greater level of participation in climate action efforts, broader support for larger initiatives and policies, and a greater reduction of greenhouse gas emissions overtime.



29 Mainers, an original art exhibit and community conversation about diversity, equity and inclusion at the Kittery Community Center on May, 13, 2022.

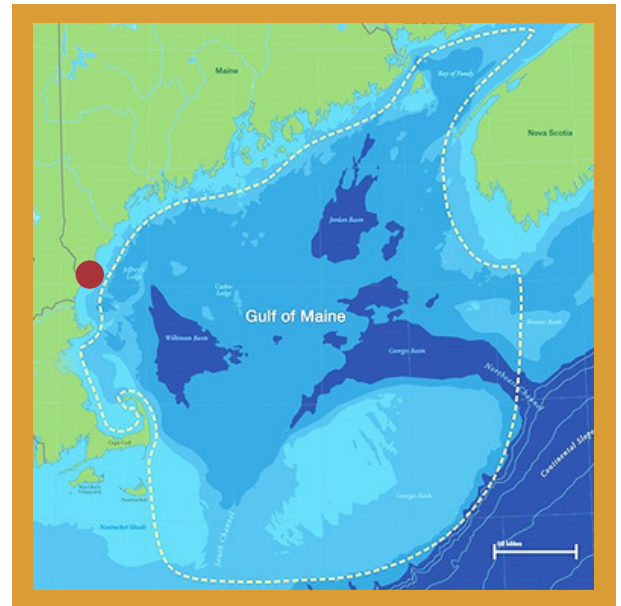
CLIMATE CHANGE IN KITTERY



CLIMATE CHANGE IS AFFECTING KITTERY

Kittery is bordered by the Gulf of Maine to the south and Piscataqua River to the west. The town is characterized by coastal inlets, wetlands, and low lying areas, and has both densely developed and rural areas. Its geographic location, physical characteristics, and demographic composition make Kittery, and the town's 10,000+ residents, vulnerable to the climate hazards and impacts described below.

The impacts of climate change will not be felt evenly across the community. Portions of the population that have elevated social vulnerability will be disproportionately affected by climate hazards and will have lower ability to prepare for, respond to, and recover from disruptions related to climate change. Kittery's demographic composition means that **certain residents, such as those with low income, people with disabilities, and older populations, are at greater risk of climate impacts, exacerbating vulnerability.**



How were these impacts determined?

A climate change vulnerability assessment was conducted to identify who, what, and where will be impacted by local climate hazards and what those impacts could be. The assessment used a combination of national, state, and local data sets, as well as input from the Task Force and community members, to assess local impacts of climate hazards (flooding from sea level rise and storm surge, precipitation and extreme storms, extreme temperatures, drought, and changing marine conditions) and Kittery's vulnerability to those hazards. Find the full assessment in [Appendix D](#).

Climate Hazards

Kittery faces major threats to the future of its community and beloved places. Increasing temperatures, changing precipitation, sea level rise, and shifting ecosystems are driving changes in Kittery.

Increasing Temperatures

- Maine's statewide annual temperature has increased by 3.2 °F (≈1.8 °C) since 1895.
- There will be 4 times more extreme heat days (heat index >95°F) in Southern Maine by 2050.



Changing Precipitation

- Maine's annual precipitation (rain and snowfall) has increased by more than 6 inches since 1895, and extreme precipitation events are becoming more frequent.



Extreme precipitation causes flooding, stormwater runoff, and can overwhelm stormwater infrastructure. Kittery's low lying ground and many wetlands and waterbodies increase the risk of flooding.

Drought and Wildfires

- Warmer air temperatures and changing precipitation patterns are increasing the severity of droughts.
- In the last five years, York County experienced three severe droughts, each lasting between two and eight months.
- Wildfire frequency, particularly in the spring, is increasing due to drought, decreased snowpack, and windier conditions.



Over the last few decades, Kittery has experienced slightly more wildfires compared to the rest of the county. In the future, more intense droughts have the potential to increase wildfire risk, threatening public safety and the natural environment.

Changing Ecosystems

- System-wide changes to marine and land ecosystems are decreasing biodiversity and giving a leg up to invasive species.
- Of the State's 378 most at-risk fish and wildlife species, nearly one-third are predicted to be negatively affected by climate-change related threats, including habitat shifts and alterations, droughts, temperature extremes, and storms and flooding.



Kittery's coastal areas (neighborhoods, infrastructure like roads and bridges, and natural resources) are increasingly vulnerable to flooding as sea level rises and storms become more intense and frequent. A storm in Dec. 2022 caused flooding and damage to the town landing at Pepperrell Cove.

Sea Level Rise

- By 2050, Maine will likely experience between 1.1 and 1.8 feet of sea level rise, and between 3.0 and 4.6 feet of sea level rise by 2100, with higher amounts possible.
- Future sea level rise will exacerbate the impacts of storm surge and increase the likelihood and severity of coastal flooding, especially during storm events.
- Sea levels will very likely rise for centuries.

Climate Vulnerabilities

Public Health

- Warmer, shorter winters are contributing to increased occurrences of vector-borne illnesses. The prevalence of tickborne diseases in York County has increased in recent years, with rates of Lyme disease doubling and rare diseases like anaplasmosis and babesiosis becoming more common.
- Extreme heat is one of the most significant impacts of climate change on human health and is the leading cause of weather-related deaths across the US. Extreme heat and heat waves are putting people at risk, especially those who are elderly, have health issues, or have limited access to home air conditioning.
- Heat emergencies are linked with increased emergency department visits. Heat is particularly dangerous for individuals with existing health conditions, older populations, and children.



Certain demographic characteristics increase the vulnerability of some community members, and this in turn increases public health risks. Relative to the rest of the state, **Kittery has an aging population**, with 28% of the total population aged 65+ and 10% aged 65+ and living alone. **The town also has a relatively high proportion of lower income residents**, with 8% living below federal poverty levels and 37% earning less than \$50,000 annually, which is below the State and county median income levels and the U.S. Environmental Protection Agency climate change and social vulnerability income threshold. Kittery is home to a military installation. **Approximately 15% of students are military-connected.** Military families have short stays and often have fewer community connections during their time in Kittery.

Elevated Risk



In recent years, **York County had the second highest number of annual emergency department visits for heat-related illness across Maine**, behind Cumberland County.



Public Health Continued

- Increasing frequency of wildfires, both locally and across North America negatively affect public health by creating poor air quality and public safety risks.
- Like the rest of Maine, Kittery's aging electrical grid is increasingly vulnerable to extreme storms and increasing temperatures. This will result in more frequent and longer duration power outages that can pose serious risks for public health and safety.
- Drought and decreases in summertime precipitation are negatively impacting drinking water supply for both private wells and public water systems.

Elevated Risk

The **Forside, Admiralty Village, and areas along Route 1** are “**urban heat islands**”, or areas with a lot of impervious surfaces, such as buildings and pavement, that absorb and reemit heat. Both the Forside and Admiralty Village neighborhoods have more community members who are renters, have low annual incomes, and who face other social and health barriers. This makes these areas particularly susceptible to extreme heat.

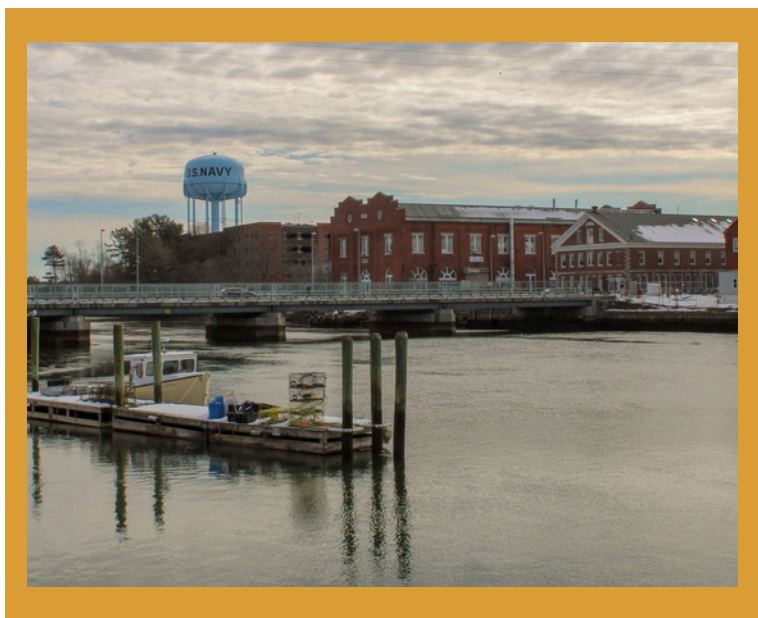


Elevated Risk

Increasing temperatures paired with less snowfall has increased the occurrence of local tickborne diseases. Since 2016, **Kittery has had the second highest rate of Babesiosis and ninth highest rate of Lyme of all York County communities.**

Infrastructure

- Neighborhoods, roads, bridges, and other infrastructure located around Spruce Creek, the Piscataqua River, and coastal areas of Kittery Point are particularly vulnerable to flood hazards. With climate change, neighborhoods such as Admiralty Village, which is an area of elevated social vulnerability, can expect more frequent flooding events and associated damage to property, infrastructure, and the coastline.
- Critical community infrastructure, including roads, bridges, culverts, stormwater systems, is at risk of damage and failure from precipitation-based flooding and sea level rise. As sea level rises and storms become more frequent and intense, Kittery can expect to see more damage from coastal flooding, high winds, and heavy rainfall.
- Drinking water wells, septic systems, and subsurface infrastructure such as sewer and water mains are vulnerable to failure as coastal water tables rise and groundwater becomes contaminated by saltwater due to sea level rise.



Elevated Risk

Roadways vital for local and regional travel, emergency evacuation, and neighborhood access are vulnerable to flooding from storms and sea level rise and could become impassable during and after storm events. Vulnerable roads include Route 103 near the Portsmouth Naval Shipyard gate 2 entrance, the Route 1 bridge over Spruce Creek, Seapoint Road near Chauncey Creek, and road access to the Kittery Point Fire Station. Working waterfront infrastructure, including the Town Pier and Harbormaster's Office at Frisbee's Wharf/Pepperrell Cove, are also vulnerable to coastal flooding.





Natural Environment

- Increases in precipitation, stormwater runoff, saltwater intrusion into groundwater, and drought conditions will negatively affect water quality and ecosystem health, such as in the Spruce Creek Watershed where water quality impairments already exist.
- Sea level rise threatens to erode and flood coastal beaches and tidal marshes. Along Kittery's coast, sea level rise will lead to less dry beach, which will impact local species. Kittery's dry beach width (distance from the mean high water to seawall or dune edge) is projected to decrease by 4.1 acres, or by 47% with 1.6 feet of sea level rise.
- Sea level rise can lead to the landward migration of tidal marshes in the absence of physical barriers that would inhibit that migration.
- Recent droughts resulted in historically low groundwater levels in York County. There have been no reports that the Kittery Water District or Kittery's 295 private wells have experienced significant water quality or supply issues from past droughts. However, more frequent and severe droughts in the future could negatively impact water quantity and quality.
- Saltwater intrusion into groundwater, resulting from both drought and sea level rise, also threatens groundwater quality.

Areas of Kittery, including **Spruce Creek, Brave Boat Harbor, and Seapoint Beach**, could support future expansion of coastal marshes as sea level rises, helping to preserve these **valuable coastal ecosystems**. However, impervious surfaces and man-made structures in some of those areas will inhibit that marsh migration.



- Average, extreme, and wintertime temperatures are stressing local flora and fauna and aiding the spread of invasive species, decreasing biodiversity in Kittery's natural areas like Fort Foster, the Town Farm Forest, Fort McCleary, and areas within the Rachel Carson National Wildlife Refuge.
- Most properties in coastal portions of town have private septic systems that could be vulnerable to failure from flooding or rising groundwater driven by sea level rise, resulting in possible contamination of nearby surface waters and groundwater.



Public Services

- More frequent flooding and extreme weather events will likely require more frequent response, repair, and recovery efforts leading to higher municipal costs and strained municipal capacity.
- Coastal and inland flooding may cut off emergency routes and access to neighborhoods during storm events, impeding emergency services and threatening public safety.
- Sea level rise threatens municipal budgets and the community operations, services, and programs those budgets support, as coastal properties, which generate a significant portion of municipal tax revenue, become increasingly vulnerable to flooding and their value diminishes.



With 1.6 ft of sea level rise, flooding from storm surge will cut off road access to 201 properties in Kittery, mostly in Kittery Point, putting the people who live there and critical infrastructure for emergency access to them at risk.



Properties that are vulnerable to flooding from storm surge combined with 1.6 ft of sea level rise have a total assessed value of almost \$141 million, representing more than 4% of town-wide assessed property value (2021 assessment values) and almost 5% of the town's 2021 municipal budget.



Local Economy

- More frequent and intense droughts have the potential to reduce local farmers' production, increase their costs, and disrupt the local food system and economy.
- Tourism activity driven by Kittery's sandy beaches and healthy coastline could decline as biodiversity decreases, flooding becomes more frequent, and the amount of dry beach decreases as sea level rises.
- Sea level rise and coastal storms will put Kittery's harbor and working waterfront areas at increasing risk of damage and flooding, threatening commercial and recreational fishing activities and the economic vitality of working waterfronts.



KITTERY'S GREENHOUSE GAS EMISSIONS

Greenhouse gas (GHG) emissions are created when Kittery's residents, visitors, and workers engage in daily activities such as driving, heating homes, and powering appliances and devices.

Measuring GHGs from specific sources helps the Town understand where and how to take action to achieve its goals.

Types of Greenhouse Gases

Carbon Dioxide (CO2)

Carbon dioxide is the main byproduct of fossil fuel combustion, such as burning gasoline, oil, coal, or other fuels for energy.

Methane (CH4)

Methane is primarily emitted through agricultural activities, waste management, and natural gas combustion. Pound for pound, the comparative impact of methane is 25 times greater than carbon dioxide over a 100-year period.

Nitrous Oxide (NO2)

Nitrous oxide is primarily emitted through agricultural soil management and fertilizer use. Fertilizer production and domestic wastewater management are also sources.

Fluorinated Gases

Synthetic gases that are emitted from a variety of household and commercial applications such as refrigerants, aerosol propellants, foam blowing agents, solvents, and fire retardants. Although they are emitted at far lower quantities, they are particularly potent and trap substantially more heat than carbon dioxide.

Sources of Emissions

Transportation

Emissions from the burning of fossil fuels from cars, trucks, ships, trains and planes.

Residential Buildings

Emissions from homes are from burning fossil fuels for heat and electricity.

Commercial & Industry

Emissions from businesses from electricity use and fossil fuel burning for heat and manufacturing.

Waste

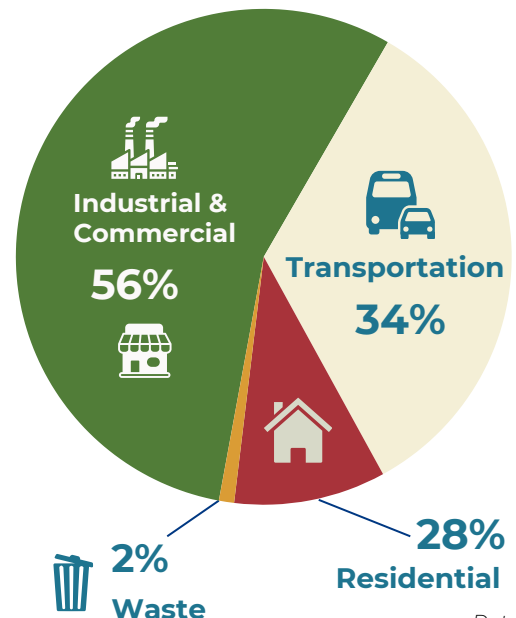
Includes emissions from septic tanks, the Kittery Wastewater Treatment Plant, and the incineration of all trash generated by residential and commercial activity in the community that is sent to the EcoMaine waste-to-energy plant.



Where does this data come from?

This data comes from a 2019 Greenhouse Gas Inventory conducted by the Town of Kittery. See a summary of the data in [Appendix C: GHG Emissions Summary and Forecast](#) or view the whole [GHG Inventory](#) on the Town's website.

Kittery's Carbon Dioxide Emissions from Fossil Fuel Combustion by Source (2019)

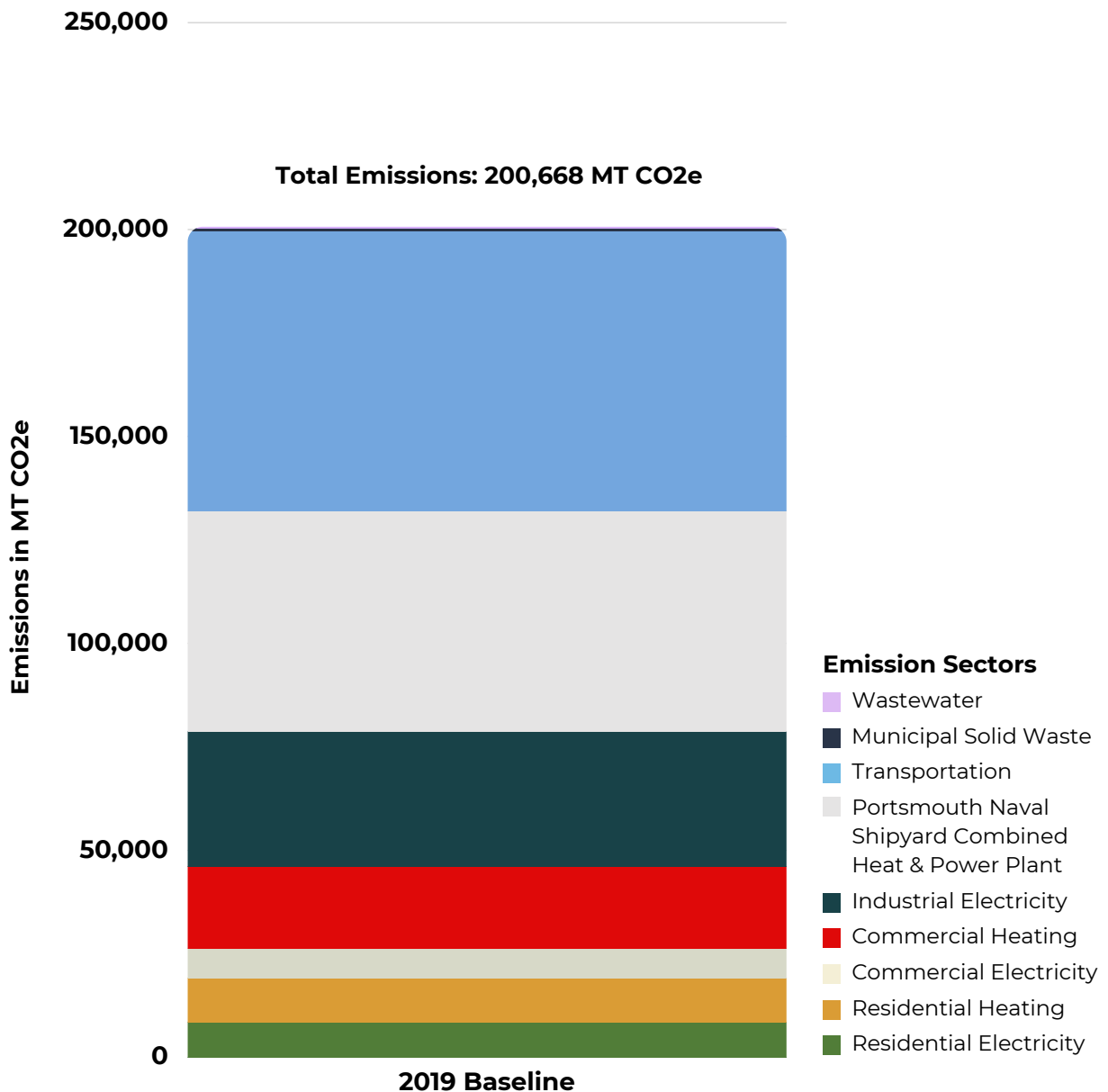


Data source:
Southern Maine Planning and
Development Commission, 2022

GHG INVENTORY KEY TAKEAWAYS

- 1 The largest source (26.6%) of estimated community-wide GHG emissions is the Portsmouth Naval Shipyard's (PNSY) combined heat and power plant, which is fueled primarily by natural gas.
- 2 The second largest source (24.3%) of estimated community-wide emissions is passenger vehicle fuel use by visitors and residents.
- 3 Municipal GHG emissions are a small subset of community-wide emissions, accounting for 1% of estimated community-wide emissions. Of this, the largest source (30.16%) of estimated municipal emissions is wastewater treatment, both at the Kittery Wastewater Treatment Plant and in septic systems.

2019 Community-wide Inventory - Baseline



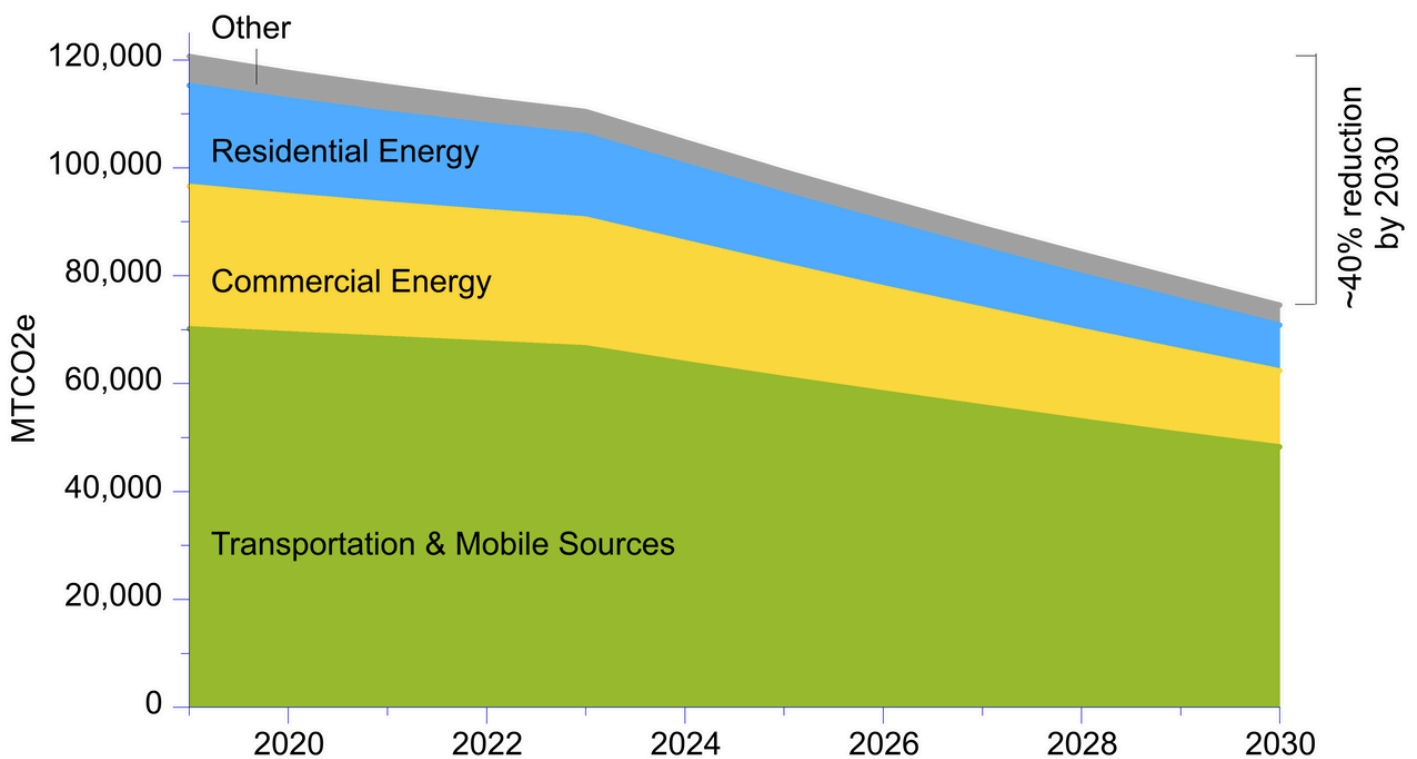
GHG REDUCTION MODELLING

The Town of Kittery used the ICLEI ClearPath platform to estimate how implementing Kittery's Climate Action Plan strategies can reduce community-wide GHG emissions by 2030 in seven different emissions sources from 120,699 MTCO₂e in 2019 to 74,578 MTCO₂e in 2030, a reduction of 38%. This does not include emissions from the Portsmouth Naval Shipyard.

Building on the 2019 Kittery Greenhouse Gas Emissions Inventory, the ClearPath platform produces a "business-as-usual" scenario that accounts for federal, state, and utility policies and plans that affect the carbon intensity of the electricity grid and fuel efficiency of vehicles. In the business-as-usual scenario, federal and statewide action are projected to reduce Kittery's community-wide GHG emissions (not including PNS emissions) 17% by 2030 compared to 2019 emissions. This represents a reduction from 120,699 MTCO₂e in 2019 to 100,030 MTCO₂e in 2030. These emission reductions are driven primarily by increasing renewable energy sources on the electricity grid as a result of state targets and renewable portfolio standards and decreasing transportation emissions due to federal fuel efficiency standards and electric vehicle expansion.

The Town used the ClearPath platform to model specific actions that could produce an additional 21% reduction in GHG emissions between 2024 and 2030 and help the Town approach its 40% community-based emissions reduction goal. The greatest reductions resulting from Kittery specific actions are projected to come from three sources: transportation, commercial energy use, and residential energy use.

Projected Kittery Community-wide GHG emissions reductions from 2019 – 2030



Comparison of Kittery's community-wide GHG emissions in 2019 to 2030 projected emissions.

Source*	2019 Emissions (MTCO ₂ e)	Projected 2030 Emissions (MTCO ₂ e)	Reduction Amount (MTCO ₂ e)	Percent Change
Transportation	70,155	48,226	21,929	-31%
Commercial	26,396	14,159	12,237	-46%
Residential	18,734	8,433	10,301	-55%
Upstream Impacts	2,334	495	1,839	-79%
Process & Fugitive	1,985	2,104	-119	+6%
Solid Waste	608	644	-36	+6%
Water & Wastewater	487	517	-30	+6%
Total	120,699	74,578	46,121	-38%

* Industrial energy (primarily representing energy used by the Portsmouth Naval Shipyard) is not included in this table. Upstream Impacts are the emissions associated with the production and delivery of electricity.

Transportation (11,766 MTCO₂e reduction potential, 10% of total reduction)



- The largest portion of greenhouse gas reduction will result from an increase in EVs that replace 17% of gasoline powered vehicles and 5% of diesel powered vehicles by 2030. Increases in EVs will be supported by federal and state incentives along with expanding EV infrastructure (Strategy 22) and increasing public and private use of EVs (Strategy 23).
- Reducing vehicle miles traveled (VMT) will be supported by expanding access to and use of public transportation (Strategy 18), directing development to areas that already have critical services (Strategy 19), and improving bikeability and walkability (Strategy 20). Note that increasing public transit does result in an increase in transit related emissions. However, the resulting reduction in VMT results in three times more greenhouse gas reductions.

Commercial Energy (8,000 MTCO₂e reduction potential, 7% of total reduction)



- Conducting energy efficiency retrofits and installing air source heat pumps in 5% of the total area of commercial energy buildings per year will significantly reduce fossil fuel energy use (Strategies 12 and 13).
- Installing 350 kilowatts of solar photovoltaic panels per year on commercial properties will decrease the carbon intensity of electricity (Strategy 14).



Ribbon-cutting ceremony to celebrate the opening of the Electric Vehicle Charging Stations at the Kittery Town Hall.

Residential Energy (4,776 MTCO₂e reduction potential, 4% of total reduction)

- Increase the number of heat pumps in Kittery households from the estimate of 20% in 2023 to 48% in 2030 (Strategy 13).
- Complete energy efficient retrofits on 2% of houses in Kittery per year and ensuring all new houses are energy efficient (Strategy 12).
- Install 350 kilowatts (KW) of solar photovoltaic panels per year on Kittery houses (Strategy 14). In 2023, Kittery approved 24 permits for residential solar installations for a total of 202 KW installed capacity. Solar installations will need to increase to keep pace with the climate action plan projections.



Where does this data come from?

See [Appendix C: Emissions Reduction Modeling Details](#) to find annual and cumulative emissions reductions for each modeled emissions reduction measure between 2024 and 2030.

The table below summarizes specific metrics to track progress against Kittery's CAP GHG reduction targets:

Category	Metric*
Transportation	Reduce overall VMT by 15% from 117 million in 2019 to 99 million in 2030
	Increase light-duty EVs to 17% of total light-duty vehicles in Kittery by 2030 (1,640 EVs) from 0.9% in 2022 (123 EVs)
	Increase medium/heavy-duty EVs to 5% of total medium/heavy duty vehicles in Kittery by 2030
Commercial Energy	Increase of 35% from 2024-2030 of commercial building area that received energy efficiency retrofits and heat pumps installed
	Increase solar capacity on commercial property by 2,450 kilowatts by 2030
Residential Energy	Increase installed heat pumps by 28% from 1,000 in 2022 to 2,382 in 2030
	Increase of 14% from 2024-2030 of housing units the receive energy efficiency retrofits (700 housing units)
	Increase solar capacity on residential property by 2,450 kilowatts by 2030

*Baseline from 2019 (Kittery Emissions Inventory), Maine DEP (2024), 2022 (US Census Data), or 2023 (Maine Won't Wait Progress Report),

CLIMATE ACTIONS



CLIMATE ACTIONS

Climate Actions Overview

The Town of Kittery is taking climate action in the following focus areas:



- **Land Use and Natural Environment:** Protecting and enhancing natural resources while directing development to protect vulnerable people and places.



- **Health, Safety and Well-being:** Ensuring the health and safety of Kittery's community members and increasing overall community resilience.



- **Building and Energy Efficiency:** Making buildings and energy systems resilient and reducing their emissions.



- **Transportation, Roads, and Utilities:** Strengthening local transportation systems and infrastructure while supporting the transition to low and zero emissions transportation.



- **Leadership and Capacity:** Fostering leadership and support for climate action between municipal staff, community members, and partner organizations.

Guiding Criteria

To assess and prioritize strategies that align with Kittery's values and priorities, The Task Force used a framework that incorporates guiding criteria and considerations.

Primary Criteria		
Effective	Efficient	Feasible
<p>Emissions reduction: To what extent does this strategy reduce greenhouse gas emissions?</p> <p>Adaptation: To what extent does this strategy reduce either physical or social vulnerability and or build resilience to climate change?</p>	<p>What is the financial cost to implement the strategy and what are the financial cost savings?</p>	<p>Does this strategy have the necessary conditions (i.e financing, public support, political will, and human resources) to enable implementation?</p>
Additional Considerations		
Equitable	Wider Co-Benefits	
<p>Are the costs and benefits of this strategy fairly distributed? Does the strategy minimize harm for the most vulnerable groups?</p>	<p>Does this strategy provide broader benefits for health, social wellbeing, the environment, and the economy?</p>	

Priorities

The 29 strategies identified in this climate action plan fall under three broad priorities that serve to reduce greenhouse gas emissions and enable adaptation to climate change. In the climate action tables that follow each strategy is identified with an icon to illustrate the priority the strategy supports.



Resiliency

Resiliency refers to climate resilience, the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate.



Electrification

Electrification is the switch from fossil fuel energy to clean energy. It involves cleaning up electricity generation by replacing traditional fossil-fuel generation with renewable energy, energy storage systems, and a smart electric grid AND electrifying everything by replacing oil and gas heating systems and vehicles.



Efficiency

Energy Efficiency is using less energy to get the job done, whether for heating homes, powering transportation, or processing waste. To successfully reduce emissions to net-zero, electrification needs to be paired with increased efficiency for everything that uses electricity.

How to read the action tables

The action tables on the following pages are arranged by focus areas and include the **strategies and actions items** the Town will pursue. Each action has a **category** that indicates whether the action is:

- Consistent with an action in at least one other CAP of a Southern Maine CAP Cohort community.
- Consistent with strategies in the State of Maine's CAP, Maine Won't Wait.
- An action requiring regional or state engagement.

Not all actions will have a category designation.

An estimated **timeframe** has been assigned to each action, reflecting how long sustained effort will be required to complete it. Short timeframe actions include locally controlled ordinance and policy development, while long timeframe actions include regional and state efforts, or those actions which will take iterative and successively larger effort to achieve the final desired result.

Equity considerations reflect the barriers identified that must be considered in the implementation of the action. They include financial, time, language, access, health, and residency barriers. Not all actions have an equity consideration (See [page 23](#) for more information about equity considerations).

Cost is a broad assessment of the total investment required to implement an action. Lower cost efforts are actions that can be accomplished by existing staff or operations or may be fundable through the annual municipal or school budget. High cost efforts are large infrastructure projects (roads, bridges, stormwater) or the establishment of wholly new programs or operations.



How to Read the Action Tables

- CAP COHORT Consistent Strategy
- Associated strategy in Maine Won't Wait
- Regional Strategy

Timeframe Required to Implement:

- Short = 1-2 years
- Medium = 3-4 years
- Long = 5+ years

Costs:

- Low = \$
- Medium = \$\$
- High = \$\$\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
1. Direct growth to areas with existing infrastructure and low flood risk				
Implement coastal flood hazard ordinance		Short		\$
Refine ordinance to allow increased density in areas with sewer, water, energy transmission, public transit, and other amenities.		Medium		\$
Identify long-term strategies to reclaim coastal land for resiliency and public access.		Long		\$\$\$
2. Advance use of Low Impact Development practices				
Refine Low Impact Development (LID) ordinance to: <ul style="list-style-type: none"> Allow and promote reduction and/or alternatives to impervious surfaces and stormwater run-off to limit groundwater rise and erosion. Require limit on soil disturbance. Require preservation and maintenance of natural landscapes with native vegetation. Allow and promote nature-based stormwater solutions. 		Medium		\$
3. Preserve and protect natural areas and local farms/food producers				
Expand protection and preservation of critical ecosystems such as salt and freshwater marshes.		Long		\$
Direct development away from flood-prone areas.		Long		\$
Monitor shoreland buffer modifications and fine violators.		Short		\$\$
Refine subdivision ordinance to require more open space in zones with no public utilities.		Short		\$
Add seasonal farmstand definition to ordinance and remove regulatory barriers for establishing seasonal farmstands.		Short		\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
4. Limit use of fertilizers, pesticides, and herbicides				
Advocate for statewide limits on residential use of fertilizers, pesticides, and herbicides, particularly in shoreland areas.	★ ▲	Long	Financial Language Residency	\$
Amend ordinances to require more climate resilient landscaping.	★ ▲	Short		\$
5. Preserve and revitalize working waterfronts				
Adopt policies and ordinances that limit or remove barriers to access to coastal areas and working waterfront.	●	Short		\$
Promote access to the fishing, landing, and processing of sustainable food sources from the waterfront, encourage development of new/emerging fisheries and aquaculture.	●	Long		\$
Support infrastructure at dock and marine facilities to enable electric fleets.	★ ●	Long	Financial	\$\$
Support the development of aquaculture.	● ▲	Long	Financial Language Residency	\$\$
Permit only water-dependent uses along the shore.		Medium		\$
Require future coastal development and redevelopment to be climate/flood resilient and energy-efficient.	★ ●	Long		\$\$
6. Maintain and increase tree cover and access to shade				
Develop a Town-wide tree program to encourage protection and planting of climate-resilient trees.		Short		\$
Inventory heat islands, street trees, and shade areas, and develop a plan to plant more trees and install shade areas.		Short		\$





How to Read the Action Tables

- CAP COHORT Consistent Strategy
- Associated strategy in Maine Won't Wait
- Regional Strategy

Timeframe required to Implement:

- Short = 1-2 years
- Medium = 3-4 years
- Long = 5+ years

Costs:

- Low = \$
- Medium = \$\$
- High = \$\$\$




Strategy and action items	Category	Timeframe	Equity Consideration	Cost
7. Provide advisories on health impacts of climate and extreme weather events				
Develop and implement communication strategies for public health advisories about climate-related health risks.		Medium	Language Access Health Residency	\$\$
Develop a plan for “Resilience Hubs” that can provide critical services during a disruption or health event.		Long	Language Access Health	\$\$\$
8. Enhance planning for disaster response and mitigation for current and emerging climate hazards				
Develop town-level plans for climate hazards including loss of electrical service, extreme precipitation and flooding, extreme temperatures, wildfires, and drought.		Medium		\$\$
Create a coordinated climate and health response team to address disasters and establish a network for pre- and post-event coordination.		Medium		\$\$
Enhance collaboration with York County Emergency Management Agency on hazard mitigation planning.		Medium		\$\$
9. Assess potential impacts of groundwater rise on septic systems and wells				
Advocate for regional groundwater modeling effort to identify areas of risk for groundwater rise and saltwater intrusion.		Medium		\$\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
10. Provide education on public health impacts of climate change				
Implement community and school-based programs to educate the community about public health impacts - including vector-borne diseases, low air-quality days, and heat-related illness.	★ ● ▲	Medium	Time Language Access Health Residency	\$\$
Ensure education includes additional information-sharing methods for contacting “harder-to reach” audiences (e.g. vulnerable populations, seasonal workers).	★ ● ▲	Medium	Time Language Access Health Residency	\$\$
11. Evaluate and update evacuation routes to reflect current and future flood risk areas				
Review and update evacuation routes, along with the signage and maps that direct people away from flood hazard areas.	● ▲	Short		\$





How to Read the Action Tables










-  CAP COHORT Consistent Strategy
-  Associated strategy in Maine Won't Wait
-  Regional Strategy

Timeframe required to Implement:

- Short = 1-2 years
- Medium = 3-4 years
- Long = 5+ years

Costs:

- Low = \$
- Medium = \$\$
- High = \$\$\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
12. Increase efficiency in public and private buildings				
Support weatherization outreach programs that provide resources and information on efficiency evaluation, Efficiency Maine incentives, contractors, and financing options.		Short	Financial Time Language Access Health	\$\$
Create incentives to build energy efficient affordable housing within Town.		Long	Financial Time Language	\$\$
Support the adoption of higher efficiency building codes at a regional level.		Long		\$
Support monitoring of energy efficiency in municipal and school facilities - along with planning for additional efficiency measures.		Medium		\$\$\$
13. Support efforts by Efficiency Maine to transition single family homes and other buildings to heat pumps				
Support usage of state and federal heat pump adoption programs for single family homes.		Short	Financial Time Language Access Health	\$\$
Support current town plans to transition more municipal buildings to heat pumps. Encourage the school system to consider opportunities to transition to heat pumps.		Medium		\$\$
14. Encourage distributed renewable energy				
Support community solarization programs that provide resources and information on solar evaluation, Efficiency Maine incentives, contractors, and financing options.		Short	Financial Time Language Access Health	\$\$
Actively engage in discussions of off-shore wind and other renewable sources at the regional level.		Medium		\$
Continue to evaluate municipal and school property for renewable energy sources.		Long		\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
15. Support improved grid resilience				
Support regional-level planning in cooperation with utilities to ensure a strong grid in the transition to greater electric dependency and for all potential crises.	★ ● ▲	Long		\$\$\$
16. Promote resilient building designs				
Encourage building designs and modifications that consider both current and potential future hazards from climate change.	●	Long		\$\$
Ensure critical facilities consider climate-related weather risks in both location and design and ensure they have plans for resiliency.	★ ● ▲	Long		\$\$\$
Promote reuse or rehabilitation of buildings and homes.	★ ▲	Long	Financial Time Language Access Health	\$\$
17. Promote hazard disclosure for property transactions				
Encourage the State to require flood risk disclosures for all property transactions.	★ ▲	Long		\$





TRANSPORTATION AND INFRASTRUCTURE

FACILITATING THE TRANSITION TO LOW AND ZERO EMISSIONS TRANSPORTATION WHILE SUPPORTING ALTERNATIVES TO SINGLE-OCCUPANCY VEHICLES AND STRENGTHENING LOCAL INFRASTRUCTURE.

How to Read the Action Tables

- CAP COHORT Consistent Strategy
- Associated strategy in Maine Won't Wait
- Regional Strategy

Timeframe required to Implement:

- Short = 1-2 years
- Medium = 3-4 years
- Long = 5+ years

Costs:

- Low = \$
- Medium = \$\$
- High = \$\$\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
18. Expand access to and use of public transportation services				
Mount a concerted regional effort towards expansion of public transportation throughout Southern Maine.		Long		\$\$\$
19. Direct development to areas of town with public utilities, public transportation and essential services				
Modify land use codes to promote infill development.		Medium		\$
Redevelop brownfield sites to increase housing stock.		Long		\$\$
20. Improve bikeability and walkability				
Improve and expand the walkability and bikeability of our roadways with safe, comfortable, and convenient paths, sidewalks, and bikeways.		Long		\$\$\$
21. Reduce paved areas in new development and redevelopment projects				
Review and amend parking ordinances to reduce minimum requirements and build in flexibility.		Short		\$
Review and update minimum parking space dimensions and parking lot design, including compact car spaces where appropriate.		Short		\$
22. Expand electric vehicle charging on public and private land				
Expand public EV charging locations through public/private partnerships- including in existing publicly-accessible but privately-owned lots and on the waterfront and wharfs.		Medium	Financial Time Language Residency	\$\$
Require EV chargers or EV-ready parking in new development and redevelopment projects.		Medium		\$\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
23. Increase public and private use of electric vehicles				
Transition municipal, school, and public transit fleets to EVs.	★ ●	Long		\$\$
Ensure the public has user-friendly information and resources to encourage and assist with purchasing EVs.	★ ● ▲	Short	Financial Language Access Health Residency	\$
Continue to push for EV charging stations along state/interstate highways as well as locally.	★ ● ▲	Long		\$
24. Protect critical water-related infrastructure				
Assess and protect critical assets such as drinking water, wastewater, and stormwater management infrastructure that will be impacted by sea level rise, storm surge, flooding and extreme weather events associated with climate change.	★ ●	Long		\$\$\$
25. Assess vulnerability and improve resilience of transportation infrastructure				
Assess impacts of heat, groundwater and sea level rise on local transportation infrastructure (roads, culverts and bridges) to understand vulnerabilities.	★ ●	Long		\$\$\$
Plan and conduct appropriate upgrades such as raising or relocation of transportation infrastructure.	★ ●	Long		\$\$\$
Amend road design standards to include climate resilience.	★ ●	Medium		\$\$
Adopt a policy stating the Town will only consider adopting roads that meet updated standards.		Short		\$





LEADERSHIP AND SUPPORT

ENSURING OUR CITY HAS THE RESOURCES AND SUPPORT TO IMPLEMENT CLIMATE ACTIONS.

How to Read the Action Tables

- CAP COHORT Consistent Strategy
- Associated strategy in Maine Won't Wait
- Regional Strategy

Timeframe required to Implement:

- Short = 1-2 years
- Medium = 3-4 years
- Long = 5+ years

Costs:

- Low = \$
- Medium = \$\$
- High = \$\$\$

Strategy and action items	Category	Timeframe	Equity Consideration	Cost
26. Ensure municipal decision-making and funding strategies considers resilience and sustainability				
Adopt protocols to account for environmental conditions of today and tomorrow in municipal decision-making.		Long	Time Language Access Health Residency	\$
Include funding for resilience and sustainability infrastructure investments in annual budgets and capital plans.		Medium		\$\$\$
Provide ongoing funding for staff to plan and implement projects.		Medium		\$\$
27. Grow municipal capacity to support and implement climate adaptation strategies				
Provide town departments with the resources, space, staff, and training needed to identify, evaluate, plan, and implement adaptation approaches.		Medium		\$\$
28. Engage the community, schools, and local businesses in ongoing sustainability and resilience efforts				
Encourage more residents and local companies to take action in their own homes and businesses by providing support, education, and programs.		Medium	Financial Time Language Access Health Residency	\$\$
Maximize composting or organic material, recycling and reuse, and reduce the use of single-use plastic in Town operations.		Short		\$\$
29. Advocate for resiliency and sustainability education at the state level				
Ensure incorporation of climate change and resiliency into core and project-based learning requirements.		Long	Language	\$\$
Provide opportunities for sharing information, successes, and lessons learned throughout the region and state.		Long		\$

PNS RESPONSE TO CLIMATE CHANGE

Department of the Navy's Response

The Secretary of the Navy, Carlos Del Toro, has stated that climate change is among the most pressing challenges facing the Navy and the Marine Corps, and includes combating climate change as a key element within the Department's priority of maintaining maritime dominance. The Department of the Navy released Climate Action 2030, which articulates the Department's approach to building a climate-ready force that is resilient while operating in the evolving climate and security landscape. Climate Action 2030 also communicates the Department's commitment to reducing its contribution to climate change and achieving the national target of reaching net-zero greenhouse gas emissions by 2050.

The breadth and depth of the climate threat demands that the Navy take a holistic, enterprise-wide approach, and develop a force that is climate-ready. This will be a continual and sustained effort.



Department of the Navy Climate Goals:

Nature-based resilience – Maximizing the use of natural infrastructure to build resilience and harnessing nature to draw down an additional 5 million metric tons of carbon dioxide per year. This is the rough equivalent of taking 1 million cars off the road annually.

Energy resilience - Installing cyber-secure microgrids or comparable resilience technologies to support the most critical missions. These microgrids will leverage clean power generation and long-duration battery storage to the maximum extent practicable.



Portsmouth Naval Shipyard Climate Action Efforts

Power and Water Supply

PNS continues to develop concepts to increase reliability, resiliency and capability of electrical and water systems through conservation, improved capacity, and distribution upgrades. PNS is developing and executing the Shipyard Infrastructure Optimization Program, the Navy's once-in-a-century investment to reconfigure, modernize and optimize the four Naval Shipyards into new modern facilities that will serve the Nation into the future.

Specific actions:

- PNS has installed cogeneration turbines that use natural gas rather than fuel oil to generate electricity. The Shipyard's co-generation plant is more efficient than importing natural gas and electricity separately and this transition has been a major contribution in PNS' reduction in overall energy use.
- The Microgrid Fast Load Shed system incorporates technology that senses a power loss from the utility and has the potential to seamlessly switch to the Shipyard's microgrid with minimal interruption to operations.
- The PNS Power Plant's Battery Energy Storage system provides PNS the ability to respond to high electrical demands and stabilize the shipyard's micro grid.

Sea Level Rise

All PNS design & construction projects align with Navy guidance and Department of Defense policies to consider climate change as part of facilities design. Plans and designs are based on calculated predictions that are periodically re-assessed against actual sea level rise values and updated projections. PNS also has mitigation plans and measures in place to respond to storm events and emergency flooding.

PNS has increased the heights of multiple waterfront berths and dry docks and elevated critical infrastructure to appropriate elevations to be resilient to future storm surge and sea level rise. Additional projects to raise, repair, and protect the Shipyard's critical facilities and infrastructure are planned and under development.

Critical facilities & infrastructure that are evaluated and monitored include:

- Waterfront facilities (berths & dry docks)
- Utilities systems
- Waste storage facilities
- Installation restoration program sites



CONCLUSION

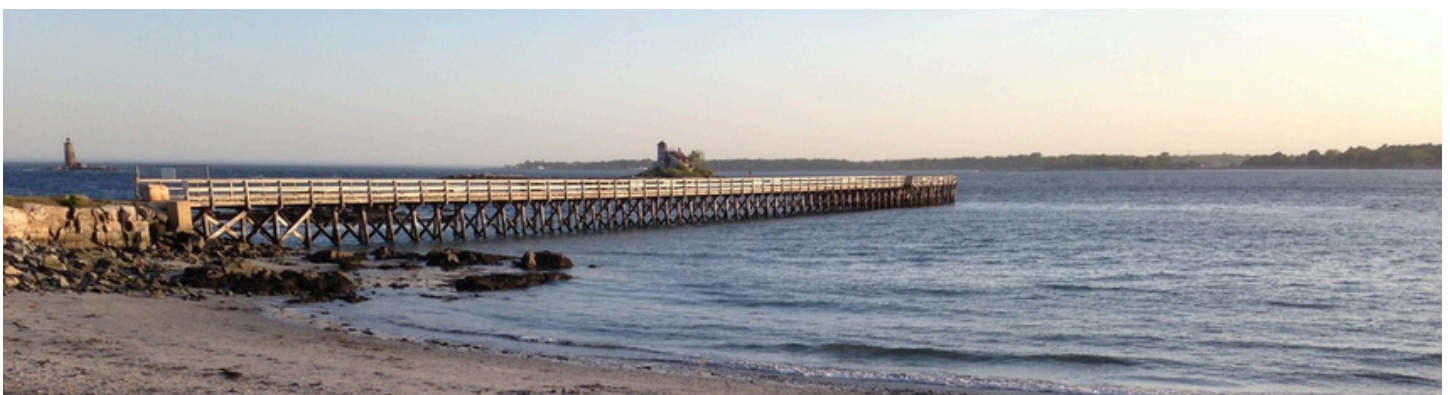


CONCLUSION

Kittery needs to act with urgency to address the negative effects of a warming climate and increasingly unpredictable and extreme weather. The Kittery Climate Action Plan lays out twenty-nine strategies that will build resilience and reduce climate-warming GHG emissions through electrification and energy efficiency.

The plan outlines action steps for each of the twenty-nine strategies. **Some of the action steps outlined in the plan are already in progress, including:**

- Kittery’s Capital Improvement Plan includes the evaluation of vulnerability for assets relative to climate change and sea level rise, and the potential to contribute to reducing GHG emissions and improving energy efficiency in its capital investment decisions.
- Kittery, in partnership with the citizen group, Kittery Climate Action Now, offers “kitchen scrap” composting with its recycling and waste collection programs.
- The Kittery Town Hall, Kittery Community Center, and Rice Public Library now compost organic waste and are transitioning to compostable products for hosted events and programs.
- The Town has installed 6 public EV charger stations, 4 at the Town Hall and 2 at Rice Library.
- The Town is transitioning its vehicle fleet to EV or Plug-In Hybrid where possible, including general fleet cars and Police cruisers.
- The Town has received funding to address coastal flooding vulnerabilities and develop nature-based adaptation options to increase the resilience of Route 103 near Portsmouth Naval Shipyard Gate Two.
- Kittery is participating in the Southern Maine Energy Navigator Pilot to assist low-and-moderate income residents with energy efficiency upgrades to their homes and help them access rebate and financial incentives offered through Efficiency Maine programs.
- The Town has received funding to design culvert adaptation options to address coastal flooding vulnerabilities and increase the resilience of portions of Seapoint Road.
- Kittery has been awarded a University of New England Fellow for the summer of 2024 to map heat islands in Town and begin developing shade tree policies that prioritize roadway tree plantings and preserve green areas.
- Kittery, working with citizen volunteers, are monitoring nitrogen and other nutrients in Spruce Creek and Legion Pond.
- Kittery is implementing a major invasive plant management program at Fort Foster to protect the native plants and habitat.



Though the twenty-nine strategies are ambitious in scope, each has been developed with a clear set of actions and identified leads or responsible parties who will be charged and aligned with to advance the implementation of the strategy. The strategies also focus on equitable solutions that adapt and reflect the needs of the broader community in a welcoming and inclusive manner, leading to a greater level of participation in climate action efforts, broader support for larger initiatives and policies, and improved outcomes on the reduction of greenhouse gas emissions overtime.

To succeed in realizing the vision and goals outlined in this plan, Kittery will need to:

Monitor progress

The Town Council has charged the Kittery Climate Adaptation Committee, in concert with the Town Manager, to report annually on its progress in implementing the strategies and action steps.



Embrace Change and a Positive Future Vision

The Kittery Comprehensive Plan is preparing to undergo an update, and the Climate Action Plan will be a significant source document and guide for that process. The Climate Action Plan communicates a vision for a resilient, energy efficient community that embraces the protection of open space and natural areas, denser development of housing and services in areas that can support walkable, bikeable neighborhoods, increased access to public transit, and equitable and inclusive services that benefit all members of the community.



Collaborate regionally

The effects of climate change do not stop at town boundaries. Kittery has benefitted from the joint planning effort with Biddeford, Kennebunkport, and Kennebunk and through the Southern Maine CAP Cohort. Kittery is committed to sustaining and growing regional collaboration to successfully implement many of Kittery's CAP strategies and action steps.



Support State initiatives to develop renewable energy and a more resilient electrical grid

A resilient and efficient electrical grid is critical to the reduction of GHG emissions overall. Residents of Maine face a transformative opportunity developing offshore wind, which could provide renewable and eventually low-cost electricity for the State and much of New England. At the very least strong support is needed to invest in renewable energy generation, and a more reliable and resilient electrical grid in the region.



Work together as a community

The past two years of planning have revealed that Kittery community members are ready to build on the broad collaboration essential to realizing this plan. Kittery's success depends on participation and support across the community

In preparing this plan, many Kittery community members shared their love for Kittery: the water that surrounds, the trees that shade, and the community that sustains and makes Kittery, Kittery.

Not acting threatens all these things, and much work lies ahead to ensure a climate-friendly future for Kittery. But the success of this planning process was driven by the effort, determination, and careful consideration of volunteers and Town Staff. Their commitment instills optimism that Kittery will find its way.

APPENDICES



APPENDIX A: GLOSSARY

Aquaculture – Breeding, raising, and harvesting of aquatic animals such as fish and oysters and aquatic plants such as kelp.

Brownfield site – A property for which redevelopment or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminate.

Climate-resilient landscaping – Utilization of Maine or Northeastern native plants that have demonstrated abilities to tolerate heat, drought and/or flooding while requiring little to no fertilization and watering once established.

Community solar – A solar project or farm that allows customers unable to access roof top solar to buy or lease shares based on usage and that delivers solar-generated power from the project or farm to the grid.

Efficiency – Describes energy-related measures taken to reduce climate change impacts, such as building energy-efficient buildings, producing fuel efficient vehicles, and reducing industrial greenhouse gas emissions.

Electrification – The process of converting fossil fuel technologies and processes to electricity, for example vehicles that use gasoline and buildings heated with oil or gas.

Extreme heat – At least two to three days of heat and humidity with temperatures above 90 degrees.

Greenhouse gas emissions (GHG) – Gases released during combustion of fossil fuels, the majority of which are carbon dioxide, with smaller amounts of methane and nitrous oxide. These emissions trap heat in the atmosphere and warm the planet.

Groundwater rise – The movement upward of the groundwater table due to fluctuations in rainfall recharge rates and/or river, ocean, or tidal levels.

Heat island – An area that is denser with buildings, roads and sidewalks which absorb and re-emit the sun's heat at higher rates than less developed areas which tend to have more trees and vegetation.

Heat-related illness – A serious medical condition resulting from the body's inability to cope with a particular heat load, resulting in heat cramps, heat exhaustion, and heat stroke.

Heat pump – An appliance that uses electricity to provide both heating and cooling to a building. To warm a building, it extracts heat from outside the building and moves it inside. To cool a building, it moves heat from inside the building to outside.

Infill development – Refers to development, often housing, that is built within an already established neighborhood or area of town on unused or underutilized land.

Impervious surface – A non-vegetated, hard surface such as pavement, roads, sidewalks, gravel driveways, stone paths or roofs, which causes rainwater to run off rather than soak into the soil.

Infrastructure – The Town's physical structures and facilities such as public roads, stormwater management systems, wastewater management plants and systems, and drinking water systems.

Low Impact Development (LID) – The process of developing land while minimizing the effects of development on water resources and the natural environment.

Nature-based Solutions (NBS) – Planning, design and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience.

Peak Time – A term used to describe the time period during which a parking lot is most highly utilized. For example, at a shopping mall, the weekends in November and December might be described as “peak time”.

Resilience – Refers to climate resilience which means the ability to prepare for, recover from, and adapt to the impacts of climate change.

Saltwater intrusion – Occurs when saltwater infiltrates freshwater sources either underground or by overtopping lower land areas near the coast. Sea level rise and storm surge are among the causes of saltwater intrusion into freshwater drinking sources.

Shoreland buffer – Designated and regulated areas of upland which abut regulated wetlands, streams, waterbodies and rivers.

Stormwater – Water, generated by rain, hail and snowmelt events that flows over land or impervious surfaces such as roads, parking lots and roofs.

Street trees – Trees that are located along public roads within the public right-of-way or planted on private property.

Sustainability – As defined by the United Nations in their publication Our Common Future: “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. There are three pillars of sustainability as described in the UN publication: environmental, social and economic.

Upstream Impacts – Greenhouse gas emissions that result from the production and delivery of electricity to Kittery.

Vector-borne disease – Disease, such as Lyme, resulting from an infection transmitted to humans by blood-feeding mosquitoes, ticks or fleas.




Vulnerable populations – Residents who due to social and economic factors like income, education, health care access and housing are more vulnerable to the impacts of climate change such as flood and heat-related impacts.

Water-dependent uses – Uses that can only occur when in, on, or adjacent to salt or fresh water, such as commercial and recreational fishing, marine transportation and seafood processing.

Working waterfront – Land in Maine that abuts tidal waters or is within the intertidal zone that is used primarily to provide access to or support of commercial fishing activities.

APPENDIX B: STRATEGY MATRIX

Relationships









-  CAP COHORT Consistent Strategy
-  Associated strategy in Maine Won't Wait
-  Regional Strategy

Timeframe required to Implement:

- Short = 1-2 years
- Medium = 3-4 years
- Long = 5+ years

Costs:

- Low = \$
- Medium = \$\$
- High = \$\$\$

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
1	Direct growth to areas with existing infrastructure and low flood risk	Natural Environment & Land Use	Resiliency	Current & Future	Town Council, Planning Board, Town Administration				
	Action Items	Implement coastal flood hazard ordinance						Short	\$
		Refine ordinance to allow increased density in areas with sewer, water, energy transmission, public transit, and other amenities.						Medium	\$
		Identify long-term strategies to reclaim coastal land for resiliency and public access.						Long	\$\$\$
2	Advance use of Low Impact Development practices	Natural Environment & Land Use	Resiliency	Current	Town Council, Planning Board, Town Administration				
	Action Items	Refine Low Impact Development (LID) ordinance to: <ul style="list-style-type: none"> Allow and promote reduction and/or alternatives to impervious surfaces and stormwater run-off to limit groundwater rise and erosion. Require limit on soil disturbance. Require preservation and maintenance of natural landscapes with native vegetation. Allow and promote nature-based stormwater solutions. 					 	Medium	\$
3	Preserve and protect natural areas and local farms/food producers	Natural Environment & Land Use	Resiliency	Future	Town Council, Planning Board, Town Administration, Community				
	Action Items	Expand protection and preservation of critical ecosystems such as salt and freshwater marshes.						Long	\$
		Direct development away from flood-prone areas.						Long	\$
		Monitor shoreland buffer modifications and fine violators.						Short	\$\$\$
		Refine subdivision ordinance to require more open space in zones with no public utilities.						Short	\$
		Add seasonal farmstand definition to ordinance and remove regulatory barriers for establishing seasonal farmstands.					 	Short	\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
4	Limit use of fertilizers, pesticides, and herbicides	Natural Environment & Land Use	Resiliency	Future	Town Council, Community, Region				
Action Items	Advocate for statewide limits on residential use of fertilizers, pesticides, and herbicides, particularly in shoreland areas.					Financial Language Residency	★ ▲	Long	\$
	Amend ordinances to require more climate resilient landscaping.						★ ▲	Short	\$
5	Preserve and revitalize working waterfronts	Natural Environment & Land Use	Resiliency	Current	Town Council, Planning Board, Town Administration				
Action Items	Adopt policies and ordinances that limit or remove barriers to access to coastal areas and working waterfront.						●	Short	\$
	Promote access to the fishing, landing, and processing of sustainable food sources from the waterfront, encourage development of new/emerging fisheries and aquaculture.						●	Long	\$
	Support infrastructure at dock and marine facilities to enable electric fleets.					Financial	★ ●	Long	\$\$
	Support the development of aquaculture.					Financial Language Residency	● ▲	Long	\$\$
	Permit only water-dependent uses along the shore.							Medium	\$
	Require future coastal development and redevelopment to be climate/flood resilient and energy-efficient.						●	Long	\$\$
6	Maintain and increase tree cover and access to shade	Natural Environment & Land Use	Resiliency	Future	Town Council, Town Administration				
Action Items	Develop a Town-wide tree program to encourage protection and planting of climate-resilient trees.							Short	\$
	Inventory heat islands, street trees, and shade areas, and develop a plan to plant more trees and install shade areas.							Short	\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
7	Provide advisories on health impacts of climate and extreme weather events	Health, Safety & Well-Being	Resiliency	Current	Town Council, Town Administration, York Hospital, Maine CDC				
Action Items	Develop and implement communication strategies for public health advisories about climate-related health risks.					Language Access Residency	▲	Medium	\$\$
	Develop a plan for “Resilience Hubs” that can provide critical services during a disruption or health event.					Language Access Health	▲	Long	\$\$\$
8	Enhance planning for disaster response and mitigation for current and emerging climate hazards	Health, Safety & Well-Being	Resiliency	Current	Town Administration, York County Emergency Mgmt, PNS				
Action Items	Develop town-level plans for climate hazards including loss of electrical service, extreme precipitation and flooding, extreme temperatures, wildfires, and drought.						★ ● ▲	Medium	\$\$
	Create a coordinated climate and health response team to address disasters and establish a network for pre- and post-event coordination.						★ ● ▲	Medium	\$\$
	Enhance collaboration with York County Emergency Management Agency on hazard mitigation planning.						★ ● ▲	Medium	\$\$
9	Assess potential impacts of groundwater rise on septic systems and wells	Health, Safety & Well-Being	Resiliency	Future	SMPDC				
Action Items	Advocate for regional groundwater modeling effort to identify areas of risk for groundwater rise and saltwater intrusion.						★ ▲	Medium	\$\$
10	Provide education on public health impacts of climate change	Health, Safety & Well-Being	Resiliency	Current	Town Council, Town Administration, York Hospital				
Action Items	Implement community and school-based programs to educate the community about public health impacts - including vector-borne diseases, low air-quality days, and heat-related illness.					Time Language Access Health Residency	★ ● ▲	Medium	\$\$
	Ensure education includes additional information-sharing methods for contacting “harder-to reach” audiences (e.g. vulnerable populations, seasonal workers).					Time Language Access Health Residency	★ ● ▲	Medium	\$\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
11	Evaluate and update evacuation routes to reflect current and future flood risk areas	Health, Safety & Well-Being	Resiliency	Future	York County Emergency Management, Town Administration, PNS				
Action Items	Review and update evacuation routes, along with the signage and maps that direct people away from flood hazard areas.						● ▲	Short	\$
12	Increase efficiency in public and private buildings	Buildings & Energy	Efficiency	Current & Future	Town Administration, York County Emergency Mgmt, PNS				
Action Items	Support weatherization outreach programs that provide resources and information on efficiency evaluation, Efficiency Maine incentives, contractors, and financing options.					Financial Time Language Access Health	★ ●	Short	\$\$
	Create incentives to build energy efficient affordable housing within Town.					Financial Time Language	★ ● ▲	Long	\$\$
	Support the adoption of higher efficiency building codes at a regional level.						★ ● ▲	Long	\$
	Support monitoring of energy efficiency in municipal and school facilities - along with planning for additional efficiency measures.						●	Medium	\$\$\$
13	Support efforts by Efficiency Maine to transition single family homes and other buildings to heat pumps	Buildings & Energy	Electrification	Current	State				
Action Items	Support usage of state and federal heat pump adoption programs for single family homes.					Financial Time Language Access Health	★ ●	Short	\$\$
	Support current town plans to transition more municipal buildings to heat pumps. Encourage the school system to consider opportunities to transition to heat pumps.						★ ●	Medium	\$\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
14	Encourage distributed renewable energy	Buildings & Energy	Resiliency, Electrification	Future	Town Council, Town Administration, Community				
Action Items	Support community solarization programs that provide resources and information on solar evaluation, Efficiency Maine incentives, contractors, and financing options.					Financial Time Language Access Health	●	Short	\$\$
	Actively engage in discussions of off-shore wind and other renewable sources at the regional level.						● ▲	Medium	\$
	Continue to evaluate municipal and school property for renewable energy sources.						●	Long	\$
15	Support improved grid resilience	Buildings & Energy	Resiliency, Electrification	Future	Region				
Action Items	Support regional-level planning in cooperation with utilities to ensure a strong grid in the transition to greater electric dependency and for all potential crises.						★ ● ▲	Long	\$\$\$
16	Promote resilient building designs	Buildings & Energy	Resiliency	Current	Planning Board, Community				
Action Items	Encourage building designs and modifications that consider both current and potential future hazards from climate change.						●	Long	\$\$
	Ensure critical facilities consider climate-related weather risks in both location and design and ensure they have plans for resiliency.						★ ● ▲	Long	\$\$\$
	Promote reuse or rehabilitation of buildings and homes.					Financial Time Language Access Health	★ ▲	Long	\$\$
17	Promote hazard disclosure for property transactions	Buildings & Energy	Resiliency	Future	State				
Action Items	Encourage the State to require flood risk disclosures for all property transactions.						★ ▲	Long	\$
18	Expand access to and use of public transportation services	Transportation & Infrastructure	Efficiency	Future	Town Council, Region, State, Community, PNS				
Action Items	Mount a concerted regional effort towards expansion of public transportation throughout Southern Maine.						★ ● ▲	Long	\$\$\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
19	Direct development to areas of town with public utilities, public transportation and essential services	Transportation & Infrastructure	Efficiency	Current	Town Council, Planning Board, Town Administration				
Action Items	Modify land use codes to promote infill development.							Medium	\$
	Redevelop brownfield sites to increase housing stock.							Long	\$\$
20	Improve bikeability and walkability	Transportation & Infrastructure	Efficiency	Current	Town Council, Planning Board, Town Administration				
Action Items	Improve and expand the walkability and bikeability of our roadways with safe, comfortable, and convenient paths, sidewalks, and bikeways.						●	Long	\$\$\$
21	Reduce paved areas in new development and redevelopment projects	Transportation & Infrastructure	Efficiency	Current	Town Council, Planning Board, Town Administration				
Action Items	Review and amend parking ordinances to reduce minimum requirements and build in flexibility.							Short	\$
	Review and update minimum parking space dimensions and parking lot design, including compact car spaces where appropriate.							Short	\$
22	Expand electric vehicle charging on public and private land	Transportation & Infrastructure	Electrification	Future	Town Council, Town Administration				
Action Items	Expand public EV charging locations through public/private partnerships- including in existing publicly-accessible but privately-owned lots and on the waterfront and wharfs.					Financial Time Language Residency	★ ●	Medium	\$\$
	Require EV chargers or EV-ready parking in new development and redevelopment projects.						★ ●	Medium	\$\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
23	Increase public and private use of electric vehicles	Transportation & Infrastructure	Electrification	Current	Town Administration, School Dept, State, Region, Federal				
Action Items	Transition municipal, school, and public transit fleets to EVs.						★ ●	Long	\$\$
	Ensure the public has user-friendly information and resources to encourage and assist with purchasing EVs.					Financial Language Access Health Residency	★ ● ▲	Short	\$
	Continue to push for EV charging stations along state/interstate highways as well as locally.						★ ● ▲	Long	\$
24	Protect critical water-related infrastructure	Transportation & Infrastructure	Resiliency	Future	Town Council, Region, State				
Action Items	Assess and protect critical assets such as drinking water, wastewater, and stormwater management infrastructure that will be impacted by sea level rise, storm surge, flooding and extreme weather events associated with climate change.						★ ●	Long	\$\$\$
25	Assess vulnerability and improve resilience of transportation infrastructure	Transportation & Infrastructure	Resiliency	Future	Town Council, Planning Board, Town Administration				
Action Items	Assess impacts of heat, groundwater and sea level rise on local transportation infrastructure (roads, culverts and bridges) to understand vulnerabilities.						★ ●	Long	\$\$\$
	Plan and conduct appropriate upgrades such as raising or relocation of transportation infrastructure.						★ ●	Long	\$\$\$
	Amend road design standards to include climate resilience.						★ ●	Medium	\$\$
	Adopt a policy stating the Town will only consider adopting roads that meet updated standards.							Short	\$

Strategy Matrix

Strategy Number	Strategy	Category	Focus Area	Status	Leads	Equity Consideration	Relationships	Timeframe	Costs
26	Ensure municipal decision-making and funding strategies considers resilience and sustainability	Leadership and Support	Resiliency	Current	Town Council, Town Administration				
Action Items	Adopt protocols to account for environmental conditions of today and tomorrow in municipal decision-making.					Time Language Access Health Residency	●	Long	\$
	Include funding for resilience and sustainability infrastructure investments in annual budgets and capital plans.							Medium	\$\$\$
	Provide ongoing funding for staff to plan and implement projects.						★ ● ▲	Medium	\$\$
27	Grow municipal capacity to support and implement climate adaptation strategies	Leadership and Support	Resiliency	Current	Town Council, Town Administration				
Action Items	Provide town departments with the resources, space, staff, and training needed to identify, evaluate, plan, and implement adaptation approaches.						★ ●	Medium	\$\$
28	Engage the community, schools, and local businesses in ongoing sustainability and resilience efforts	Leadership and Support	Resiliency	Current	Town Council, Town Administration, Community				
Action Items	Encourage more residents and local companies to take action in their own homes and businesses by providing support, education, and programs.					Financial Time Language Access Health Residency	★ ●	Medium	\$\$\$
	Maximize composting or organic material, recycling and reuse, and reduce the use of single-use plastic in Town operations.						●	Short	\$\$\$
29	Advocate for resiliency and sustainability education at the state level	Leadership and Support	Resiliency	Future	State, School Committee, School Dept				
Action Items	Ensure incorporation of climate change and resiliency into core and project-based learning requirements.					Language	★ ● ▲	Long	\$\$
	Provide opportunities for sharing information, successes, and lessons learned throughout the region and state.						★ ● ▲	Long	\$

APPENDIX C: EMISSIONS REDUCTION MODELING DETAILS

Table B1: Transportation Emissions Reduction Estimates (MTCO_{2e})

Year	EVs Replace Gas VMT	EVs Replace Diesel VMT	VMT reduction (gas)	Compact Develop.	Public Transit	Annual Total	Cumulative
2024	-927	-139	-672	-95	-18	-1,851	-1,851
2025	-922	-137	-660	-93	17	-1,795	-3,646
2026	-915	-134	-648	-91	52	-1,736	-5,382
2027	-908	-133	-636	-89	86	-1,680	-7,062
2028	-900	-130	-625	-88	119	-1,624	-8,686
2029	-891	-128	-613	-86	150	-1,568	-10,254
2030	-880	-126	-602	-84	180	-1,512	-11,766

Table B2: Commercial Energy Emissions Reduction Estimates (MTCO_{2e})

Year	Efficiency & Electrification	Solar	Total	Cumulative
2024	-1,066	-50	-1,116	-1,116
2025	-1,084	-43	-1,127	-2,243
2026	-1,100	-37	-1,137	-3,380
2027	-1,113	-32	-1,145	-4,525
2028	-1,125	-28	-1,153	-5,678
2029	-1,134	-24	-1,158	-6,836
2030	-1,144	-20	-1,164	-8,000

APPENDIX D: CLIMATE PROJECTIONS FOR KITTERY MAINE

Climate Projections for Portsmouth, NH/Kittery, ME*

Climate Indicator	Historical 1980-2009	Change from historical (+ or -)					
		2010-2039		2040-2069		2070-2099	
		Low Emissions	High Emissions	Low Emissions	High Emissions	Low Emissions	High Emissions
Maximum Temperature (deg F)							
Annual TMAX	59.7	2.0	2.1	3.8	5.3	4.8	9.1
Winter TMAX	37.0	2.1	2.4	4.1	5.6	5.2	9.2
Spring TMAX	57.6	2.1	2.0	3.8	5.1	4.9	8.5
Summer TMAX	81.3	1.8	1.9	3.5	5.0	4.4	9.1
Fall TMAX	62.4	1.9	2.1	3.8	5.4	4.8	9.5
Minimum Temperature (deg F)							
Annual TMIN	59.7	2.0	2.1	3.8	5.3	4.8	9.1
Winter TMIN	17.2	2.5	2.9	4.9	6.6	6.2	10.8
Spring TMIN	34.4	2.0	2.0	3.7	5.0	4.8	8.5
Summer TMIN	56.3	1.7	1.8	3.4	4.8	4.2	8.7
Fall TMIN	39.7	1.8	2.0	3.7	5.3	4.8	9.4
Precipitation (inches)							
Annual PRECIP	45.3	1.5	1.6	2.3	3.0	3.0	4.5
Winter PRECIP	11.7	0.6	0.5	0.8	1.4	1.4	2.2
Spring PRECIP	11.4	0.4	0.7	0.6	0.9	0.8	1.6
Summer PRECIP	9.7	0.4	0.4	0.6	0.4	0.7	0.5
Fall PRECIP	12.5	0.2	0.1	0.4	0.4	0.2	0.4
Heating & Cooling Degree Days							
Heating Degree Days	6631	-554	-1436	-1055	-1412	-1337	-2296
Cooling Degree Days	536	169	183	354	529	462	1066
Extreme Temperature							
TMAX coldest day of year (F)	14.5	2.9	3.1	5.7	7.8	7.4	13.2
TMIN coldest day of year (F)	-9.3	3.4	4.3	7.5	10.3	9.7	17.2
Days < 0F	6.2	-2.7	-3.2	-4.6	-5.3	-5.2	-6.1
Days < 32F	148.6	-13.0	-14.3	-25.2	-34.7	-32.8	-60.5
Days > 90F	10.9	7.0	7.6	15.6	24.1	20.6	50.9
Days > 95F	1.9	2.6	2.9	6.4	11.2	9.0	29.9
TMAX hottest day of year (F)	96.1	2.2	2.6	4.1	5.9	5.3	10.2
TMIN hottest day of year (F)	43.3	1.8	3.1	3.2	7.8	4.0	13.2
Days TMIN > 28F	244.5	13.2	13.6	23.1	34.6	31.0	68.3
Extreme Precipitation							
Days > 1 inch in 24 hours	6.3	0.6	0.7	1.2	1.6	1.5	2.5
Days > 2 inch in 24 hours	0.9	0.1	0.1	0.2	0.3	0.3	0.6
Events > 4 inches in 48 hours	0.3	0.1	0.1	0.2	0.2	0.2	0.3
Precip. wettest day of year (in)	2.2	0.1	0.2	0.2	0.3	0.2	0.5
Snow Cover Days	113	-12	-13	-26	-43	-38	-97

* From: New Hampshire Climate Assessment 2021. <https://scholars.unh.edu/sustainability/71>

APPENDIX E: REFERENCES

Kittery and Southern Maine Planning Development Commission (SMPDC) Documents

These reports and video can be accessed on the Kittery Climate Action Committee web page:
<https://www.kitteryme.gov/climate-adaptation-committee>

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SMPDC and Town of Kittery (2022) Greenhouse Gas Inventory: Town of Kittery.

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Additional Reports and Online Tools

Wake, CP and 9 others (2019) New Hampshire Coastal Flood Risk Summary – Part I: Science. Prepared for the New Hampshire Coastal Flood Risk Science and Technical Advisory Panel. Report published by the University of New Hampshire, Durham, NH. <https://scholars.unh.edu/ersc/210/>

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ICLEI (Local Governments for Sustainability) (2024) Clearpath Online Software Platform.
<https://icleiusa.org/clearpath/>