

# DRAFT Detailed Maine Climate Action Plan Outline

October 19, 2020

Dear Climate Council members,

We are in the home stretch! We look forward to seeing you at our upcoming Wednesday Maine Climate Council Meeting.

Please find attached a **detailed outline** of the draft Maine Climate Action Plan for your review with some new content details filled in. The draft is not final and your comments are welcome. We will continue to finalize specifics, make decisions, and seek your ongoing input on the draft strategies and proposed outcomes through the November meeting, until the plan is finally approved.

The purpose of this detailed outline is to show how the many strategies and actions, together with an implementation chart and funding approach recommendation, come together into a Climate Action Plan for Maine. Several additional other elements will be added to the final plan, including a letter from the Governor and co-chairs, some stories of Maine people and businesses, photos, an executive summary, and some vision/call to action statements.

We are still awaiting some final emissions modeling results, which will further inform some of the metrics and outcomes needed to achieve the state's 2030 emission reduction goals, and our 2050 pathway. Some of the TBDs in the plan, especially in the metrics and outcomes areas, are associated with this final modeling analysis.

A complete draft plan will be shared for your approval in advance of the November 12<sup>th</sup> council meeting.

In the attached detailed outline, specific actions have been amended in response to suggestions we received from you during previous meetings. In particular, we want to draw your attention to some of the additional items in this draft and the policy additions that we will review at our upcoming meeting. These include (in red in the draft):

- **Overall:** Please note some reorganization in the draft, and more concrete information on the actions and proposed outcomes. We will discuss those details – especially the outcomes – at our Wednesday meeting. In addition, we'll focus on the resilience, adaptation, and sequestration recommendations, which received less focus in the last Council meeting.
- **Transportation:** Based on our discussion of low- and moderate-income Mainers, the transportation strategy now includes used EV's, hybrid vehicles and a recommendation to consider rebates for purchases of high-MPG vehicles.
- **Buildings:** added recommendations to implement appliance standards, a phase-down of hydrofluorocarbons (HFCs - climate super pollutants). Authorization for Commercial Property-Assessed Clean energy (C-PACE) financing programs are included in the funding discussion.
- Other new strategies and actions have been added or amended:
  - **Commitment to Addressing Climate Equity** and equity considerations throughout; we are considering different approaches to make sure the equity considerations in each section are clearly addressed – and more content will be added throughout.

- **Strategy F: Protect Maine’s Natural and Working Lands and Waters and Promote Natural Climate Solutions** – Many actions in this section have been consolidated and some moved to the following new Strategy G and preceding Strategy D.
  - **Strategy G: Grow Good Jobs and Maine’s Clean Energy Economy, and Protect Natural Resource Industries** - This section draws some sections from the previous section that included the protection of natural based industries and adds new recommendations from the “Clean Energy Economy” report.
  - **Strategy H: Educate Maine People about Climate Change Impacts and Opportunities**
- **Implementation Section:** with an attached separate implementation chart; funding recommendations, and metrics.

We are continuing to develop the attached draft implementation chart, working with agencies to identify existing programs that can be leveraged, illustrate areas where there is a need for legislative action, administrative action, funding allocation, local government planning, etc.

We look forward to seeing you on Wednesday. Thank you for your continued hard work and engagement.

-Sarah and the GOPIF team

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# Executive Summary

*Will include summary of overall document and brief detail on the 8 strategies and actions within each.*

## **Strategy A: Welcome the Future of Transportation to Maine**

1. Increase electric vehicles (EV) use
2. Reduce emissions from current gas and diesel engines
3. Reduce vehicle miles traveled

## **Strategy B: Modernize Maine's Buildings: Energy Efficient, Smart and Cost-Effective Homes and Businesses**

1. Transition to cleaner heating and cooling systems and efficient appliances
2. Improve the efficiency of existing buildings
3. Advance the design and construction of new buildings
4. Promote climate-friendly building products
5. "Lead by Example" in publicly funded buildings
6. Institute a Renewable Fuel Standard
7. Phase-down the use of hydrofluorocarbons (HFC's)

## **Strategy C: Drive Innovation to Reduce Carbon Emissions in Maine's Energy and Industrial Sectors**

1. Ensure adequate affordable clean energy supply
2. Initiate a stakeholder process to modernize Maine's electric grid
3. Accelerate the decarbonization of industrial use and processes
4. Encourage highly efficient Combined Heat and Power (CHP) facilities

## **Strategy D: Build Healthy and Resilient Communities**

1. Provide assistance and funding for community resilience
2. Adopt official sea level rise projections
3. Update land use planning and legal tools for resilience
4. Expand public health monitoring and education

## **Strategy E: Invest in Climate-Ready Infrastructure**

1. Complete a state-wide infrastructure vulnerability assessment and provide climate-ready design guidance
2. Launch a State Infrastructure Adaptation Fund and provide pre-development assistance

## **Strategy F: Protect Maine's Natural and Working Lands and Waters and Promote Natural Climate Solutions**

1. Protect Maine's natural and working lands and waters
2. Increase carbon sequestration from natural and working lands and waters
3. Provide information, technical assistance, and outreach networks to land-based, coastal, and marine stakeholders
4. Improve monitoring to understand and manage the response to climate change

### **Strategy G: Grow Good Jobs and Maine's Clean Energy Economy, and Protect Natural Resource Industries**

1. Support natural resource economies' ability to adapt to climate change impacts and new opportunities
2. Grow clean energy jobs and businesses in Maine through innovation, business support, and increased workforce education and training
3. Prepare shovel-ready infrastructure projects to revitalize Maine's economy

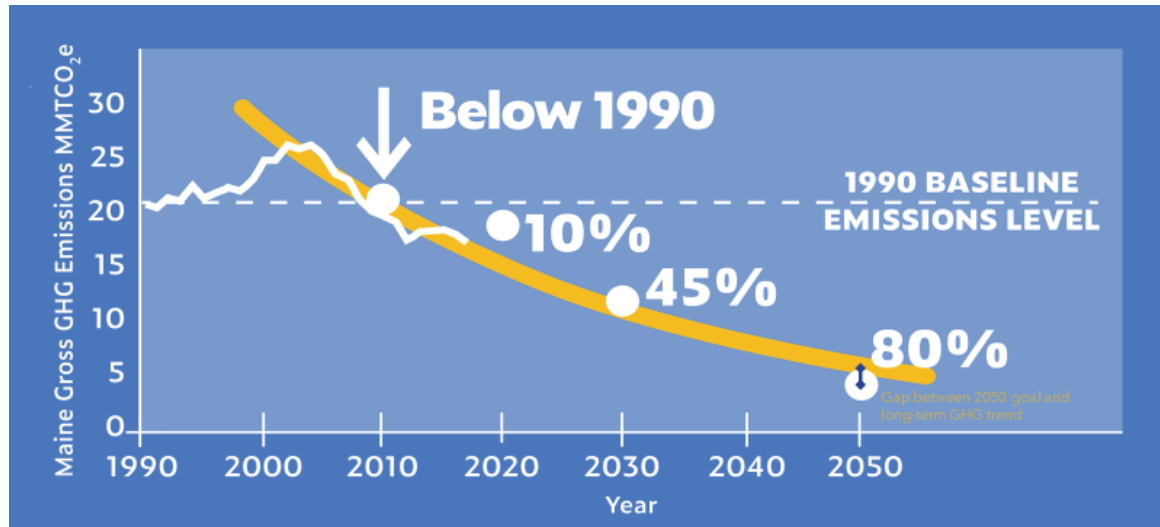
### **Strategy H: Engage Maine People and Communities in Climate Impacts and Program Opportunities**

1. Increase communication about climate change impacts and opportunities to engage in solutions
2. Increase public education on climate science and clean energy education pathways
3. Establish a Maine Climate Corps for climate-related workforce development
4. Highlight leadership on climate issues among Maine businesses and organizations

## Maine's Greenhouse Gas Emissions

While Maine has made progress in reducing its gross greenhouse gas emissions since 1990, there is still significant work to be done to create a pathway to reach our 2030 and 2050 goals.

Figure 1: Maine's Greenhouse Gas Emissions



A 2003 Maine law required the state to reduce its emissions 10% below 1990 levels by 2020 and produced the first state climate action plan in 2004. Recent legislation requires Maine to reduce gross greenhouse gas emissions 45% by 2030 and 80% by 2050. Additionally, Executive Order 10, signed by Governor Mills in 2019, requires Maine to be carbon neutral by 2045.

Research shows that 41 states, including Maine, have reduced their energy-related carbon dioxide emissions while increasing gross domestic product (GDP). Maine decreased its gross emissions by 32% from 2005 to 2017 while the state's GDP grew 4.8%.

Figure 2: Greenhouse Gas Emissions and Gross Domestic Product (GDP)

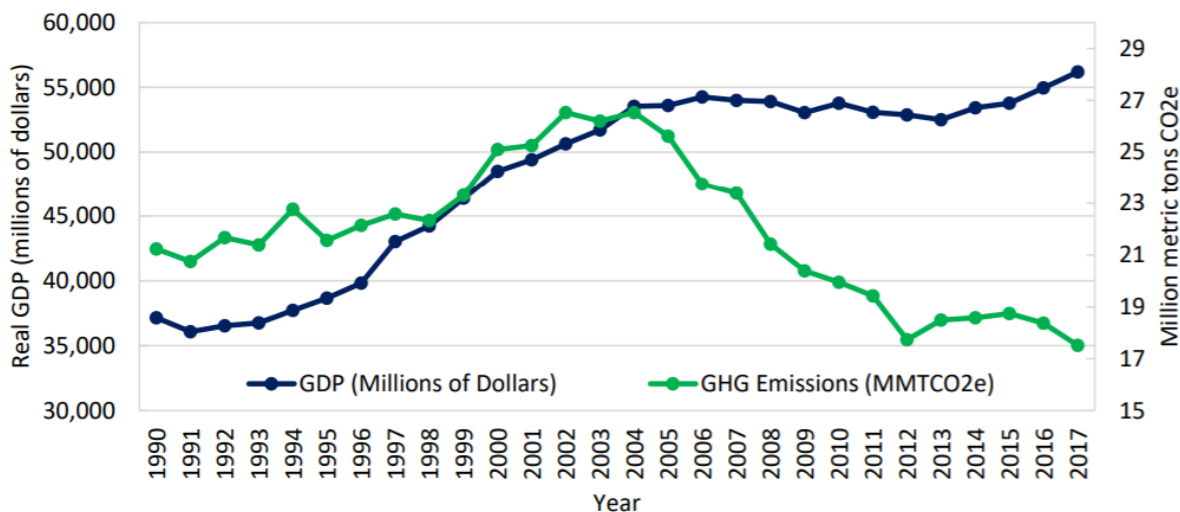


Figure 8. Total GHG emissions and real gross domestic product (GDP)

In 2017, most of Maine's greenhouse gas emissions were from transportation, followed by residential, commercial, industrial, and then the electricity sectors.

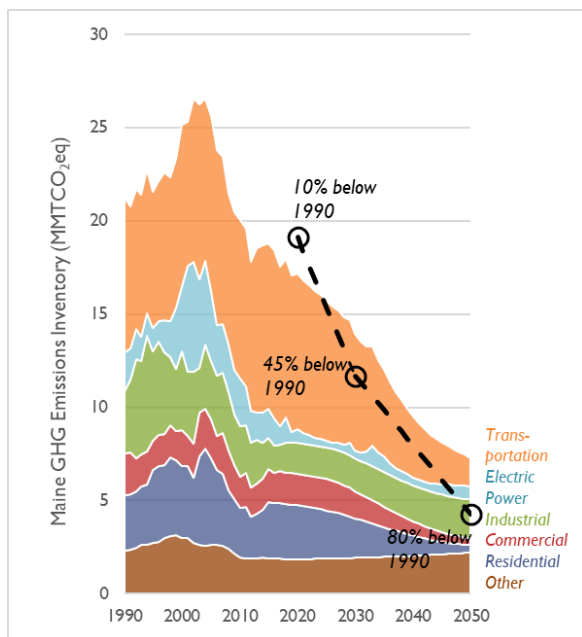
Figure 3: Maine Greenhouse Gas Emissions by Sector



To meet Maine’s ambitious greenhouse gas emissions reduction goals, emission reductions are required from all sectors – especially the transportation and buildings sector.

Innovation in the industrial sector will support decreased emissions over time, especially by 2050. And the electricity sector is already required by law to transition to 80% renewable energy by 2030, with a 100% target by 2050.

Figure 4: TO BE UPDATED WITH NEW PROJECTIONS FROM SYNAPSE



*Note: We continue to work with the consultants at Synapse to finalize the emissions pathways to meet our 2030 and 2050 goals. We anticipate new numbers this week that we will be able to share with the MCC for feedback.*

### 2030 Emissions Reductions by Sector

Sector	2017 GHG Inventory (MMT CO <sub>2e</sub> )	Current % Total Emissions	2030 Emissions Reductions %	2050 Emissions Reductions %
Transportation				
Electric Power				
Industrial*				
Commercial				
Residential				
Other **				
Total				

\* In the industrial and “other” sector, technology changes and innovation are expected to play a role in achieving Maine’s 2050 emissions reductions goal.

Pilot programs to reduce agricultural, landfill, and industrial non-CO<sub>2</sub> GHG emissions will support these efforts and developments of new industrial fuel sources like hydrogen could drive rapid change.

\*\*Other includes: waste, industrial processes, non-CO<sub>2</sub> emissions, and agriculture emissions



## What Science Tells us about the Impacts of Climate Change on Maine

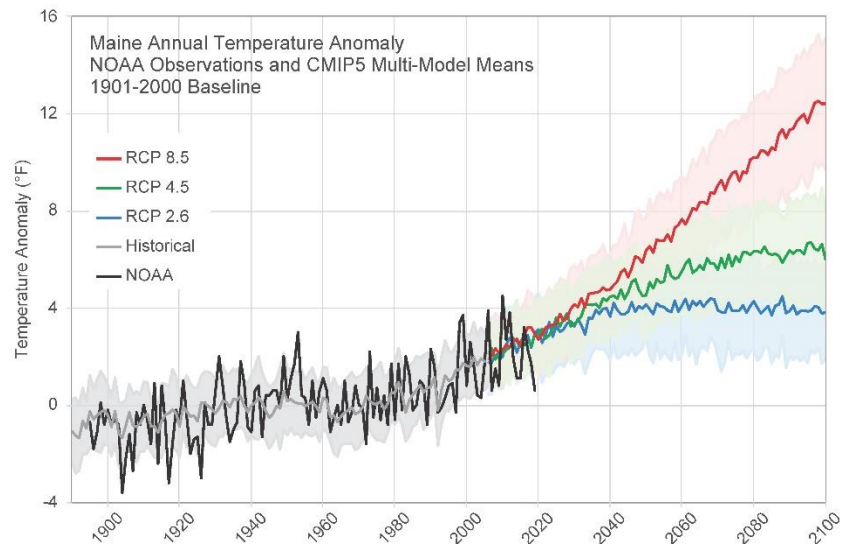
We know climate change is already affecting nearly every aspect of Maine and scientists predict that those impacts will continue and become more significant over the next century and beyond. The Maine Climate Council's Scientific and Technical Subcommittee has identified the many of the significant current and anticipated impacts from climate change on Maine in the report, "[Scientific Assessment of Climate Change and its Effects in Maine](#)." This report underlines the urgent need to reduce greenhouse gas emissions and prepare our communities and ecosystems to be more resilient to the current and future impacts of climate change.

Globally, temperatures on land and in the ocean are rising rapidly due to rising greenhouse gas levels in the atmosphere that absorb and radiate heat in a process known as the "greenhouse effect". This warming is driving changes in Earth's climate. Greenhouse gases are rising at unprecedented rates due to the combustion of petroleum products and changes in land use from human activities. Maine has been a leader in mitigating greenhouse gas emissions in the U.S., reducing our annual emissions from a high of 26.53 million metric tons of carbon dioxide equivalents (MMTCO<sub>2e</sub>) in 2002 to 17.5 MMTCO<sub>2e</sub> in 2017 (a reduction of 34%).

Unfortunately, there is still far to go, as greenhouse gas emissions are rising at increasing rates in the U.S. and globally, helping global average atmospheric carbon dioxide levels to reach  $409.8 \pm 0.1$  parts per million in 2019 – levels not experienced on Earth for at least 3 million years. In order to limit the amount of warming and increasingly severe impacts of climate change in Maine and beyond, we need to reduce our greenhouse gas emissions as quickly as possible.

The warming trend in land and ocean temperatures that scientists observe globally is even more prominent in Maine: statewide annual temperatures have risen by 3.2°F (1.8°C) since 1895, with coastal areas warming more than the interior of the state. Maine's winters have warmed faster than any other season, causing our state's growing season to increase by 2 weeks so far.

Climate models suggest that Maine may warm an additional 2 to 4°F by 2050 and up to 10°F by 2100, depending on greenhouse gas emissions. Approximately one-third of Maine's plants and animals, habitats, and Species of Greatest Conservation Need are highly vulnerable to climate change, with another one-third moderately vulnerable to its effects. Ensuring a network of biologically and geographically diverse lands that are well connected will allow plants and animals to move across the landscape to find the places they need to thrive, particularly as these habitats and species change over time.



*Observed (black line) and model-projected (gray and colored lines) potential future temperature anomalies model-projected for Maine under different socio-economic/emissions scenarios (RCPs – Representative Concentration Pathways). Anomalies are the difference between the temperature in a particular year and the 1901-2000 baseline average. See the [Scientific Assessment of Climate Change and its Effects in Maine](#), Climate chapter for more details.*

Maine has become wetter as it has warmed over the last century, with statewide annual precipitation (rainfall and snowfall) increasing by 6 inches (152 mm) since 1895, particularly in summer and fall. Heavy precipitation events of 2 to 4 inches, especially in winter and spring, have also increased over time. The increase in precipitation extremes, from very dry conditions to large storms, negatively impacts Maine agriculture and freshwater ecosystems. This increase also leads to sudden large flooding events that erode our infrastructure and degrade water quality in our ponds, lakes, streams, rivers, and coastal waters.

The Gulf of Maine, which contains a subarctic ecosystem that supports many important fisheries, has warmed significantly over the last 15 years and will continue warming through at least 2050. With low emissions scenarios, by the end of the century the southern coast of Maine may warm only 2.7°F (1.5°C) above the 1976-2005 baseline and have an ocean climate similar to Massachusetts or Rhode Island today. However, with high future emissions, by the end of the century even the eastern coast of Maine may feel like Rhode Island, with temperatures rising and exceeding 5.4°F (3°C) above the baseline.

Warming in the Gulf of Maine is resulting in more warm-water species and fewer subarctic species, creating substantial impacts on Maine’s fisheries, marine resources, ecotourism, and marine industries. Ocean acidification, which has risen at least 30% on average globally, is also expected to continue with uncertain impacts on Maine’s species. Ocean and coastal acidification will most heavily impact marine organisms that produce calcium carbonate to build shells, such as scallops, clams, mussels, and sea urchins.

Warming oceans and melting ice globally are the primary factors causing sea levels to rise. Sea levels along Maine’s coast have risen at rates of 0.6 to 0.7 feet/century (1.8 to 2 mm/year) since the early 1900s, and have accelerated to about 1 foot/century (3 to 4 mm/year) in the last few decades. About

half of the last century's sea level rise in Maine has occurred since the early 1990s, highlighting the acceleration of these trends.

**The Maine Climate Council recommends that the State *commit to managing* for 1.5 feet of relative sea level rise by 2050, and 3.9 feet of sea level rise by the year 2100. Additionally, the Council recommends that the State should *prepare to manage* for 3.0 feet of relative sea level rise by 2050, and 8.8 feet of sea level rise by the year 2100.**

This approach is one that has been adopted by several New England states and municipalities. In the context of this concept Maine should consider the *risk tolerance of different kinds of infrastructure* and a scenario-based approach that considers a range of potential future Maine sea levels. As Maine's relative sea level rises, coastal communities and ecosystems will continue to see large increases in the frequency of "nuisance flooding", inundation of coastal lowlands with salt water, erosion, and loss of dry beaches, sand dunes, and other habitats. A 1.6-foot sea level rise will submerge 67% of Maine's coastal sand dunes and reduce the dry beach area by 43%, which may happen by 2050 or earlier and would have significant impacts on coastal tourism.

Maine's forests cover 89% of the State and sequester over 60% of our annual carbon emissions (~75% including forest growth and durable products), supporting an important forest industry sector that has \$8-10B in direct economic impact. Changing climate conditions create significant stress in Maine's transitional forest environments, particularly from more extreme precipitation events and declining snowpack. In addition, Maine has some of the highest densities of non-native forest pests in the U.S., further stressing forest tree species. These same climate shifts are also affecting Maine's diverse agriculture sector, which generates over \$660M of direct value into Maine's economy. Warming temperatures and increasingly variable precipitation provide both potential benefits and potential damages to workers, crops, and livestock.

Climate change will affect all sectors of Maine's economy from tourism, agriculture and forestry to transportation. The state has, and will likely experience more, economic losses in some sectors that *may* be offset in others. Warmer temperatures, more rain, and sea-level rise will increase the incidence of flooding and damage to coastal property and infrastructure. The actions that we take to mitigate and adapt to climate change will determine, in part, the economic and social costs to Maine's economy. The extent of the costs to Maine are also dependent on how climate change will impact people and businesses, net population flows, tourism and our imports and exports.

Human and animal health are already being impacted by climate change and will continue to be affected into the future. Temperature extremes, extreme weather, tick- and mosquito-borne diseases, food- and water-borne infections, and pollen pose some of the highest risks for negative health outcomes for Mainers. Exposure to climate-related events and disasters, such as extreme storms, flooding, drought, and extreme heat, can also cause negative mental as well as physical health effects, and those with existing mental illness are often disproportionately vulnerable to climate-related events.

## The Cost of Doing Nothing

Taking action to reduce the causes of climate change and better prepare Maine for the impacts of climate change will require significant public and private investment. Alternatively, not taking action will cost Maine too, and these costs will accelerate over time. In the U.S., there have already been sixteen \$1B weather/climate disasters this year alone as of October 2020 (NOAA, 2020). There is no path forward that will be free for Maine, and already industries, communities, and people are seeing significant impacts – from infrastructure and property losses to public health effects. And the impacts of a changing climate have only started to be felt.

As part of the work done to inform the Maine Climate Council, a detailed analysis evaluated the *costs of doing nothing more* to address climate change. Following are the highlights of those likely impacts:

**Choosing to do nothing more to address climate change inflicts significant consequences and costs on Maine. In many cases these inflicted costs will be higher than the preventative costs. Notable examples include:**

Of the multiple threats Maine faces from climate change, **flooding presents the largest risk**. For coastal communities, the combination of sea level rise and repeated storm surge flooding is estimated to cost Maine \$17.5 billion in cumulative buildings damage from 2020 to 2050. For inland communities, the total value of buildings and their contents threatened by riverine flood risk is estimated at \$1.8 billion.

Between 2020 and 2050, more than \$610 million of cumulative building losses and \$1.2 billion of lost annual state GDP are expected from riverine flooding. These values do not account for potential lost jobs due to flood impacts, nor do they anticipate how riverine flooding might worsen as precipitation increases under climate change.

**Health impacts from climate can be significant.** Vector-borne diseases such as Lyme disease and eastern equine encephalitis (EEE) can have significant health consequences and can have high treatment costs. Cases of both are expected to increase as a warming climate increases the range of ticks and mosquitoes. In 2018, Lyme disease treatments cost \$11.5 million cumulatively for 1,400 new cases in Maine, not include ongoing medical costs for people suffering from chronic Lyme symptoms. Direct medical costs for EEE during an outbreak in Massachusetts were in excess of \$40,000 per patient. Because EEE can cause complications for years, lifetime interventions may reach \$5.7 million per patient.

**Nearly \$600 million in annual revenue from fishing and aquaculture are at risk from warming and acidifying ocean waters.** Maine's lobster fishery alone had landings worth \$485 million in 2019. Southern New England's precipitous drop in lobster landings coincided with warming waters, offering a clear warning to Maine. As lobster populations move northward toward cooler waters, some projections suggest that lobster abundance in the Gulf of Maine could decline 45% by 2050. Such a drop would reduce Maine's cumulative GDP by approximately \$800 million over thirty years and reduce the state's economic output by \$1.3 billion. Warming waters and acidification offer diverse challenges for other Maine fisheries and ocean-based aquaculture.

**Vulnerable, low-income communities will feel the costs of inaction more acutely and will be increasingly unable to afford the costs of recovery from disruptions.**

Floods affect more than buildings and infrastructure, they can have **devastating impacts on communities, businesses, and local economies**. For coastal communities, modeling showed that 21,000 jobs may be lost due to the cumulative impact of coastal storms and sea level rise between 2020 and 2050, without intervention.

Similarly, riverine flood risk to inland communities could put nearly 3,300 forestry, agriculture, and tourism jobs at risk. Many of these job losses will be in rural, low-income, and socially vulnerable communities. Low-resource and low-capacity communities will struggle to rebuild their livelihoods and economies if the infrastructure they depend on is not made resilient to sea level rise, increased storm events, and flooding.

**High heat days and nights are a health risk for Maine people, especially older and low-income residents.** Exposure to extreme heat is linked to a range of negative health outcomes, including heatstroke, exacerbation of existing respiratory and diabetes-related conditions, and effects on fetal health.

Cumulative treatment costs were \$224,000 for two hundred cases of heat illness in 2019. Healthcare costs will be nine to 14 times higher in 2050, costing \$1.9 million to \$3.2 million annually, if hospital visits are directly proportional to the number of days with a heat index over 90°F. With a housing stock oriented toward heating rather than cooling, Maine people stand to benefit from heat pump systems that offer both heating and cooling functions -- which is among the emissions reductions included in this plan.

**There are additional benefits for Maine for acting now avoiding the future costs of doing nothing.**

**Maine's coastal dunes, saltmarshes, and eelgrasses are under threat from erosion and sea level rise and if these features are lost due to inaction, we lose the valuable ecosystem services they provide to the state today.** Coastal dunes protect buildings and infrastructure from pounding waves and flooding, among other services valued at \$72 million annually. Saltmarshes and submerged eelgrasses protect coastlines from erosion and provide critical fish spawning habitat that supports Maine's commercial fisheries, cumulatively worth between \$34 million and \$260 million.

**Maine's beaches and dunes draw more than 13 million visitors each year, which in turn supports many coastal tourism economies.** These visitors spent \$1.7 billion in 2018 – an average of \$125 per person. By 2050, sea level rise and erosion may shrink Maine's total dry beach area by 42%, decreasing visits by more than one million people and lowering annual tourism spending by \$136 million.

**Choosing to do nothing more to address climate change limits Maine's options in the future and makes the remaining options more expensive.**

Maine's forests, saltmarshes, and coastal eelgrasses provide many economic benefits and ecosystem services, but their ability to absorb and store large amounts of carbon at low cost is reason alone to conserve these areas.

**Forests and durable wood products are estimated to capture and store the equivalent of three-quarters of the state's annual carbon dioxide emissions annually.** Every ton of carbon sequestered naturally by forests and marine ecosystems avoids the need for more expensive engineered solutions to reduce carbon dioxide in the atmosphere.

The Natural & Working Lands Work Group estimates that 10,000 acres of forest are being lost to development each year and may accelerate to 15,000 acres per year by 2030. At this rate, by 2050 Maine will lose the ability to sequester 5,700 tons of carbon naturally, requiring additional effort and costs to meet the state's emissions targets and carbon neutrality goals.

If Maine takes no additional climate mitigation or adaptation actions, **vulnerability mapping shows that at least six wastewater treatment plants will be at risk of permanent inundation** from sea level rise by 2050. The replacement costs for these six facilities will be \$31 million to \$93 million. This figure does not account for the costs of episodic flood damage that will recur during storm events. Additionally, six miles of rail, 26 miles of roadway, and 1,000 tidal culvert crossings will be permanently submerged or at risk of storm failure with significant public safety and economic consequences.

## Goals of Maine's Climate Action Plan

### Create jobs and economic opportunity

Maine is facing a significant economic downturn as a result of the COVID-19 pandemic. As Maine charts the course for economic recovery, many of the proposed solutions in this plan will support good paying jobs, growth in the economy, and the innovation and protection of economic sectors that could be most impacted by climate change.

The State of Maine is poised to significantly grow and expand its clean energy economy. The report, *Strengthening Maine's Clean Energy Economy* finds that the clean energy sector is poised to provide both near and long-term economic opportunities. Renewable energy projects are being built across the state, and innovative developments and the use of forest products and biofuels in the energy sector provide unique opportunities for Maine - particularly in the rural areas of the State. Energy efficiency investments are creating jobs, reducing energy consumption and providing energy cost savings to Maine consumers.

Investments in climate-ready infrastructure like working waterfronts, roads and bridges, wastewater and water systems, and broadband will support significant economic activity and job growth, while also supporting the backbone of our communities and economy, and ensuring Maine is more resilient to the future impacts of change.

### Reduce Maine's greenhouse gas emissions

Maine's Climate Action Plan must put us on a trajectory to reduce greenhouse gas emissions by 45% by 2030 and at least 80% by 2050 as well as outline Maine's pathway to carbon neutrality by 2045.

Reducing Maine's emissions is core to the state's effort to contribute meaningfully to national and international efforts to slow emissions, and as a result, to slow global climate change. Human activities have already caused approximately 1.0°C (1.8°F) of warming globally (IPCC, 2018), with Maine warming 3.2°F since 1895. If global climate warming is kept at or below 1.5°C (2.7°F) above the pre-industrial average, climate-related risks to humans and natural environments are lower than at 2°C of warming or above. Maine has committed to scientifically rigorous emissions reductions goals recommended by the Intergovernmental Panel on Climate Change to help keep global climate change within the warming level of 1.5°C and do our part to reduce the effects of climate change.

Maine has also established a goal of reaching carbon neutrality by 2045, separate from the state's gross emission reduction goals. Our working forests, farmlands, and natural areas, including wetlands, store carbon for the long-term. These natural and agricultural systems can be enhanced for greater carbon storage capacity, while continuing to provide critical economic, recreation, habitat and drinking water protection benefits. Reduced emissions and protecting and growing our current carbon storage will help us reach our goal and support the many co-benefits of healthy forests, farmland, and natural and coastal areas.

## Prepare Maine residents, businesses and communities for climate change impacts

From increasing land and ocean temperatures, to rising sea levels, more frequent severe storms, increased environmental damage, and public health risks, Maine scientists have catalogued the significant effects of rising greenhouse gases and climate change on our state.

The Maine Climate Council is tasked with creating a plan that works to ensure that Maine people, environment, industries, and diverse communities are more resilient to the impacts of climate change. These efforts include support for anticipated transitions for communities, businesses, families and workers who will be most impacted by climate impacts. And it should support proactive adaptation actions that support Maine communities and citizens to better withstand the impacts of climate change.

## Ensure that Maine's climate strategies are equitable

Like other dislocations and disruptions to society, from recessions to pandemics, we know that climate change will provide the greatest challenge to the most marginalized communities. Deeply considering those impacts and maintaining an ongoing focus on issues of equity is essential. It requires engaging diverse groups of Maine people and communities, especially those most impacted, in the development and implementation of effective programs and policies.

“Like COVID-19, climate change has its worst effects on people who already have low health equity to begin with. Those who, for a number of reasons, don’t have adequate opportunities to be healthier. Indeed, it’s these health inequities themselves that contribute to placing individuals and communities at risk for the deleterious effects of climate change.”

Dr. Nirav Shah, Maine Center for Disease Control; Maine Climate Council

As highlighted in the Equity Assessment of Maine's Climate Goals produced by the University of Maine Mitchell Center, “Maine is not only leading by example, but is also creating policies that will reduce emissions as well as enhance the lives and livelihoods of Maine people. This is laudable, and it is our hope that Maine can be a leader in both equitable emissions reductions, and adaptive capacity building.

The creation of Maine's Climate Action Plan offers an opportunity for transformational change. Many of the strategies put forth by the Working Groups would involve significant alterations, which are necessary both to reduce our state's greenhouse gas emissions and adapt to a changing climate. These strategies can also help alleviate inequality across the state if they target the needs of vulnerable citizens first. A more resilient Maine can also be a more equitable Maine, but climate action is not inherently just. With thoughtful analysis and deliberate action, the Maine Climate Council can recognize inequality, find the root causes, and seek to solve them using the strategies in the Climate Action Plan.”

**A new Equity Subcommittee of the Maine Climate Council is recommended to support ongoing engagement with diverse communities and climate equity issues going forward. This group would support ongoing planning and implementation including monitoring progress so that programs and strategies target those most in need.**



# Maine's Climate Strategies and Action Areas

## Part 1: Reduce Maine's Greenhouse Gas Emissions

### Strategy A: Welcome the Future of Transportation to Maine

1. Increase electric vehicle (EV) use
2. Reduce emissions from current gas and diesel engines
3. Reduce vehicle miles traveled

Transportation is responsible for 54 percent of Maine's greenhouse gas emissions—the majority of Maine's total emissions. Maine must consider major innovations and transitions in the transportation sector to reach its emissions reduction goals by 2030 and 2050.

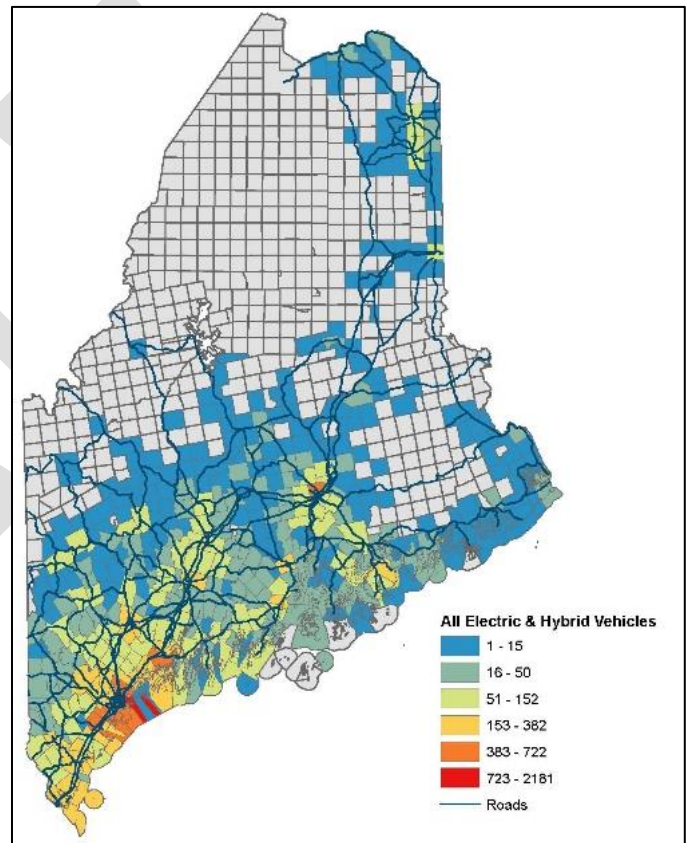
When broken down by type of vehicle, more than half (59 percent) of Maine's transportation-related emissions are from light-duty passenger cars and trucks. Another quarter (27 percent) are from medium and heavy-duty trucks, and the remaining 14 percent come from rail, marine, aviation, and utility equipment.

Maine's rural character and relatively low emissions from other sectors like electricity make our transportation emissions disproportionately high compared to other states. The average Maine vehicle travels approximately 12,000 miles per year. An analysis of "Vehicle Miles Driven" in Maine has found that 65 percent of our driving occurs on rural roads, with 35 percent in urban and suburban areas. Most of these total miles are driven in the southern half of the Maine. In addition to the emissions from Maine vehicles, Maine's transportation emissions also include the emissions from visitors to Maine, which included 37 million visitors in 2018, according to the Maine Office of Tourism.

Significant greenhouse gas emissions reduction is possible in Maine's transportation sector through large-scale electrification of Maine's transportation system, combined with strategies to reduce the number of miles Mainers drive, such as expanding telework and teleservice opportunities, expanding public transportation, and supporting development in downtowns and village areas, and strategies to increase the efficiency of the existing gas- and diesel-powered vehicles.

In addition to reduced carbon dioxide emissions to achieve Maine's emission reduction goals, there are also major health benefits associated with cleaner air from reduced transportation emissions, including reduced nitrogen oxides, sulfur dioxide, and particulate matter.

Figure 5: Maine electric and hybrid vehicles



## 1. Increase electric vehicle (EV) use

Electric vehicles (EVs) emit significantly less greenhouse gas emissions per mile compared to gas or diesel vehicles, but battery electric vehicles account for less than 0.5 percent of registered vehicles in Maine. As technology advances, issues such as vehicle range and the cost of batteries will likely be resolved, and EVs will become more available and affordable.

In order to increase EV use in the near term, Maine will need to equitably expand existing incentive programs. Providing incentives for used EV purchases and public charging infrastructure will help make this strategy more equitable for all Maine residents.

An essential next step to support the widespread adoption of EVs in Maine is the development of a statewide EV Roadmap that outlines the necessary steps needed to advance the electric vehicle market, including charging infrastructure.

### **Outcomes:**

- **By 2030, XX % of all vehicle purchases in Maine are EVs.**
- **In 2021 a Statewide EV roadmap has been developed to direct incentive programs, charging infrastructure, and equity outcomes and considerations.**
- **By 2023 Maine has developed policies, incentives and pilot programs to encourage the adoption of electric, hybrid and alternative fuel medium- and heavy-duty vehicles, public transportation, school buses, and ferries.**

## 2. Reduce emissions from current gas and diesel engines

For the light-duty vehicle market, the eventual widespread adoption of electric vehicles is the long-term goal but Maine should not wait for electric vehicles models to become more available and affordable to start reducing transportation emissions. A high fuel efficiency vehicle incentive program could start reducing emissions in the short-term and would help more Mainers benefit from more efficient driving, especially those living in rural areas. Through the high fuel efficiency program, income-eligible Maine households would receive incentives to purchase used vehicles with a fuel efficiency of at least 40 miles per gallon, including hybrid vehicles.

EPA's SmartWay program helps improve freight efficiency and save money with new technologies such as aerodynamic design, low resistance tires, and reduced idling. Voluntary participation should be encouraged with loans or grants, by ensuring technology is available, and by recognizing excellence within the program.

Biofuels, such as biodiesel, emit less carbon when burned than petroleum-based diesel and can be used instead of petroleum-based fuels to reduce emissions. Production of biofuels and lack of distributors in the state are a challenge. However, there is an economic opportunity for biofuels production in the state using Maine wood products to meet increased demand.

Federal fuel economy standards (the National Highway Traffic Safety Administration (NHTSA)'s Corporate Average Fuel Economy (CAFE) standards) regulate how many miles vehicles must travel on one gallon of fuel. Maine will support efforts for improved national CAFE standards.

**Outcomes:**

- **By 2025, Maine’s average vehicle efficiency has increased.**
- **XX increased participation in EPA Smartway program.**
- **Biofuels and biodiesel production and use has increased locally.**

**3. Reduce vehicle miles traveled**

We can reduce our greenhouse gas emissions by enabling and encouraging Mainers and tourists to drive less and offering more alternative transportation options.

Miles traveled can be reduced by expanding access to remote services including remote work, medicine, education, and other opportunities that allow people to access services without driving to get there. The expansion of broadband internet access will allow for more people to take advantage of these services. This action is especially of interest given the current COVID-19 pandemic and extensive recent local experiences with telecommuting. Expanding broadband is also a key recommendation in the State’s 10-year economic strategy and was one of the top priorities identified by the Economic Recovery Committee to stabilize Maine’s economy against the economic damage caused by COVID-19.

Expanding public transportation and ride-sharing programs, including GO MAINE and creative public transportation options in rural areas, can replace drive-alone trips and reduce household vehicle costs. Funding for public transit needs to be expanded in order to make the necessary improvements to increase participation; Maine currently spends 86 cents per capita compared to the national median of \$5 per capita.

Transportation emissions are also reduced when the places people need to go are located near each other (e.g., rural crossroads in village areas). This facilitates walking and biking, and also supports public transportation and sharing rides to nearby common destinations. Additional co-benefits include reduced costs of building and maintaining infrastructure and helping Maine’s senior population age in place. Supporting development in these areas would require effective local, regional, and state land use policies and could also include encouraging state capital investments such as affordable housing and schools, and safe pedestrian and bicycling infrastructure.

**Outcomes:**

- **Vehicle miles traveled are reduced by XX%.**
- **Maine has deployed high speed broadband to 95% of Maine homes by 2025 and 99% by 2030.**
- **Establish state coordination and strengthen land use policies and state grant programs to encourage development that support the reduction of vehicle miles traveled by XX.**
- **Maine has increased public transportation funding to the national median of \$5 per capita**
- **GO Maine relaunches to significantly increase shared commuting options.**

## **Strategy B: Modernize Maine's Buildings: Energy Efficient, Smart and Cost-Effective Homes and Businesses.**

1. **Transition to cleaner heating and cooling systems and efficient appliances**
2. **Improve the efficiency of existing buildings**
3. **Advance the design and construction of new buildings**
4. **Promote climate-friendly building products**
5. **“Lead by Example” in publicly funded buildings**
6. **Institute a Renewable Fuel Standard**
7. **Phase-down the use of hydrofluorocarbons (HFCs)**

Heating, cooling and lighting of buildings is responsible for 30 percent of Maine’s greenhouse gas emissions. Maine can reduce greenhouse gases by modernizing and improving our buildings, so they use less energy and cleaner fuels, and are built with lower carbon materials.

Building codes to improve energy efficiency, heating and cooling homes and businesses with heat pumps and heat pump water heaters, and weatherization are among the most cost-effective ways to reduce greenhouse gas emissions. Promoting innovative wood products will reduce greenhouse emissions while supporting economic development in Maine’s forest products sector. Implementing appliance standards will further reduce emissions.

These actions will also make Maine’s homes and businesses safer, healthier, more comfortable, and more affordable. Maine already has incentive programs for heat pumps and weatherization that can be expanded to achieve our goals.

Low-income households, and especially rural low-income households, often pay a higher percentage of their income to meet their home energy needs. It will be important to target financial incentives to low-income populations and underserved communities, with special attention to how information about incentives is distributed.

### **1. Transition to cleaner heating and cooling systems and efficient appliances**

Nearly 70% of the fuels currently used for home heating in Maine are either oil or propane—the highest percentage in the country. There is a growing opportunity in Maine to transition to new technologies for heating and cooling that produce lower greenhouse gas emissions. New high-performance electric heat pumps are 60 percent more efficient than oil burners.

With assistance from Efficiency Maine Trust incentives, 45,000 high performance heat pumps and 25,000 heat pump water heaters have been installed in Maine in the past several years to lower emissions and energy bills. These products have been shown to work well in the Maine climate, particularly as technologies have continued to improve. Modern wood heating



presents an opportunity to support Maine’s forest products industry while reducing emissions from home heating as compared to oil or propane systems.

Appliance standards set water and energy requirements for home appliances, plumbing products, and lighting products in our homes and businesses. They can help Maine meet our greenhouse gas emission goals by reducing energy use. States can set standards for products not covered by national standards, which are set by the U.S. Department of Energy, such as computers, portable air conditioners, and water coolers. Maine should join with other U.S. states to adopt a consistent set of standards for appliances not yet covered by national standards. We can accomplish this by partnering with states who have already developed programs and standards.

**Outcome:**

- **140,000 heat pumps installed in Maine by 2025; with at least XX installed moderate and low-income households.**
- **Appliance Standards implemented by 2022.**

**2. Improve the Efficiency of Existing Buildings**

Many of the 550,000 existing homes in Maine are aging and energy inefficient. Expanded weatherization programs will reduce emissions and save homeowners money on their utility bills by improving insulation and reducing air leakage.

Maine has successfully implemented weatherization programs to improve the energy efficiency of more than 20,000 market-rate homes since 2010, and many thousands more through the low-income programs of Maine Housing and the Community Action Programs.

These programs need to be accelerated and expanded to include commercial property owners, making thousands of homes and businesses more efficient and saving Maine people millions in deferred heating costs. Disclosure of energy usage in commercial buildings will also incentivize continuous improvements.

**Outcome:**

- **By 2025, Maine will have weatherized or done efficiency projects for XX additional homes and businesses with XX low- and moderate- income units served.**
- **By 2030, at least XX homes and x number of businesses will be weatherized.**

**3. Advance the design and construction of new buildings**

The most cost-effective time to improve a building’s energy efficiency is during construction.

Maine can increase energy efficiency and reduce greenhouse gas emissions in the buildings sector by adopting more stringent building codes over time, reaching net zero emission building codes by 2035. Net zero buildings combine energy efficiency and renewable energy generation to create homes with very low utility costs and emissions. Training for code officers and contractors to improve code compliance, and support for municipalities to improve enforcement will improve the effectiveness of the building code.

**Outcomes:**

- **By 2025, Maine will develop a long-term building codes plan to phase-in modern, energy efficient building codes to reach net zero carbon emissions for new construction by 2035**
- **Maine will also enhance existing building codes training and expand availability to support education of contractors and code enforcement officials.**

**4. Promote climate-friendly building products**

Maine should promote the use of low-carbon building materials such as mass timber and wood-fiber insulation. These innovative wood products reduce greenhouse emissions from the building sector while also supporting economic development in Maine's forest products sector. The State should seek opportunities to use mass timber building technologies in state construction projects and encourage related manufacturing facilities to locate in Maine.

**Outcome: Develop and enhance innovation support, incentives, building codes, and marketing programs to increase the use of efficient and climate-friendly Maine forest products, including mass timber and wood fiber insulation.**

**5. "Lead by Example" in publicly funded buildings**

The State should take a leadership role in reducing emissions from the buildings sector by requiring best practices in construction, including building materials selection, heating, cooling and lighting systems, and enhanced efficiency and weatherization.

This will save taxpayers money and show what modern construction materials, systems and practices can achieve to reduce both emissions and the operating costs of state and municipal government buildings, schools, universities, and affordable housing.

**Outcomes:**

- **Procurement rules for state government, affordable housing, and education to promote climate-friendly building materials and incentivize high performance buildings.**
- **Enhanced grant and loan programs to support municipal, school, and housing efficiency programs.**

**6. Institute a Renewable Fuel Standard (RFS)**

An RFS for the heating sector would require that a certain percentage of heating fuels be renewable in order to replace or reduce the quantity of greenhouse gas emitting heating fuels in residential, commercial, and industrial sectors. This would encourage the development of renewable fuels and technologies in Maine, such as biofuels made from wood biomass, biodiesels from used vegetable oils, and fuels made from anaerobic digesters on farms. These projects could create jobs in Maine's rural communities and reduce both carbon and methane emissions and heating and operating costs.

**Outcome:**

- **Investigate the options for establishing a Renewable Fuels Standard (RFS) for all heating fuels.**

## 7. Adopt Phase-down of Hydrofluorocarbons (HFCs)

Hydrofluorocarbons (HFCs) are a climate “super-pollutants”, or greenhouse gases with hundreds to thousands of times the heat-trapping power of carbon dioxide. HFCs are synthetic gases used in air conditioning systems, aerosol propellants, foam blowing agents, solvents, and flame retardants. These gases were first developed as alternatives to ozone-depleting chemicals, but their release to the atmosphere during manufacturing processes and leakage during use, servicing, and disposal of equipment poses a grave threat to our climate. Maine should join governments and U.S. states to adopt a phase-down plan the use of HFCs and replace them with climate-friendly alternatives where available.

**Outcome: HFC phase-down regulations adopted in 2021 and implemented by 2022**



## **Strategy C: Drive Innovation to Reduce Carbon Emissions in Maine's Energy and Industrial Sectors.**

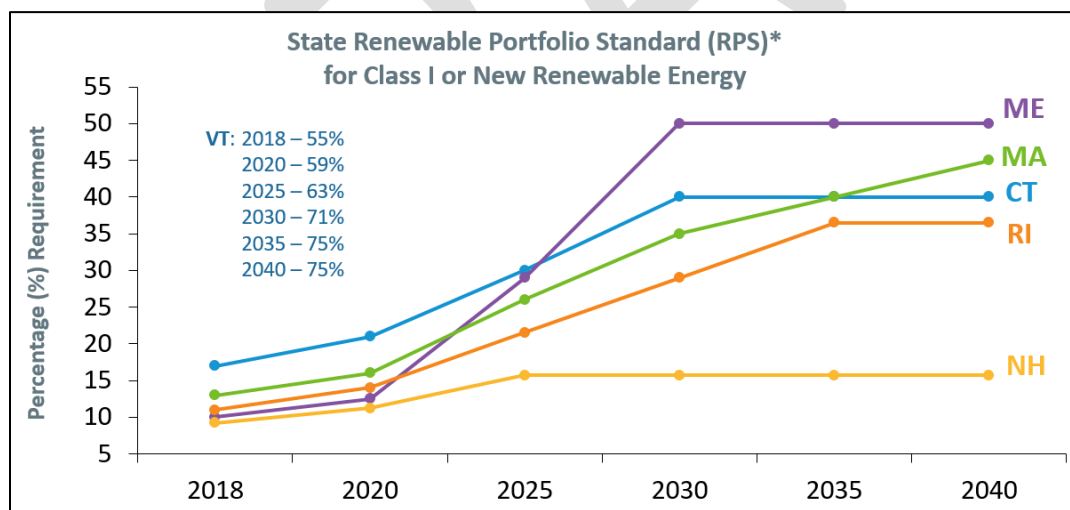
- 1. Ensure adequate affordable clean energy supply**
- 2. Initiate a stakeholder process to modernize Maine's electric grid**
- 3. Accelerate the decarbonization of industrial use and processes**
- 4. Encourage highly efficient Combined Heat and Power facilities**

Maine's climate goals will require sectors with high greenhouse gas emissions, such as transportation and heating, to shift energy sources from fossil fuels to electricity and low-carbon fuels. This makes it essential that Maine's electricity is increasingly produced by clean, low-carbon resources.

A renewable portfolio standard (RPS) establishes a percentage of electricity that a utility is required to purchase from renewable resources. To encourage more lower-emission electricity generation, Maine has increased the state RPS from 40% to 80% by 2030, with a goal of 100% clean electricity by 2050. Additionally, incentives for small-scale renewable energy generation, with the option to include energy storage development, were created by law in 2019. Storage development, like large-scale batteries, can help the electric grid accommodate increased demand and reduce peak generation needs.

Figure 8 below from ISO New England, shows the percentage requirement from Class I (new renewable energy resources) and does not contain Class II (typically existing legacy resources) requirements of the states. Maine's current Class II requirement is 30%.

*Figure 7: Maine's RPS, ISO New England*



Maine's clean energy resources provide a significant opportunity to embrace energy innovations that can drive economic growth. As overall demand for electricity increases, continued efforts must also encourage energy efficiency, and support shifts of usage away from high-use periods through demand management and "load flexibility" strategies. This will help to make the grid more reliable and reduce costs.



## 1. Ensure adequate affordable clean energy supply

Maine will need to ensure adequate affordable clean energy supply to meet our 100% Renewable Portfolio Standards (RPS) goal and any increased load through the development of centralized generating resources, distributed energy resources, and other measures.

We can leverage our unique renewable energy resources, strategic location and low-cost of development to ensure the highest benefits to Maine. This will require additional purchases of clean energy supply and development of targets for offshore wind, smaller distributed energy resources like solar located at homes and businesses, and energy storage. We will also need to carefully consider the siting of future energy assets to avoid and minimize environmental impacts and engage the public and stakeholders early in the process.

Continued development of clean energy resources to meet the state's RPS, clean energy and climate goals will create the opportunity for growth of a clean energy economy, including significant quality job creation. As Maine shifts to a cleaner electricity sector, efforts must be made to reduce negative impacts on residents and businesses, particularly in vulnerable populations. Programs for rural and low-to-moderate income households to afford new technologies and efficiencies should be expanded. Careful consideration should be given to ensure a just transition for Maine workers.

Research has demonstrated that renewable energy sources already can provide energy at a cost comparable to non-renewable sources. And as renewable energy technology advances, the cost of renewable energy is expected to continue decreasing. As Maine shifts to a cleaner electricity sector, the state must ensure that electricity rates stay affordable for all Maine households. Programs for rural and low-to-moderate income households to afford new technologies and efficiencies should be expanded. Careful consideration should be given to ensure a just transition for Maine fossil fuel industry workers.

### **Maine's Offshore Wind Opportunity:**

There are significant wind resources off the coast of Maine and responsibly sited offshore wind represents a significant opportunity for Maine's energy future and economy. As part of the state-initiated Maine Offshore Wind Initiative, the state is working to best position itself to benefit from future offshore wind projects, including opportunities for job creation, supply chain and port development, and offshore wind's impact on Maine's energy future.

To help fund this effort, the U.S. Economic Development Administration has provided the state with \$2.166M to developing a comprehensive roadmap that will build on Maine's national leadership on floating offshore wind and substantial work and research done in the state and Gulf of Maine over the last twelve years.

The roadmap will assess Maine's competitive advantage and the current state of the supply chain, infrastructure, technology, and workforce opportunities and will work to identify investments and gaps in infrastructure to best position the state to diversify its economy for the future.

This roadmap, with the state's ongoing Offshore Wind Initiative, will take a thoughtful approach to identify the best way to bring this powerful clean power industry to the Gulf of Maine while minimizing impacts to existing ocean users, especially Maine's fishing industry, and how to best maximizing economic and clean energy generation opportunities.

## Outcomes:

- **By 2030 Maine will generate 80% of its electricity power from renewable sources. Create new, or expand existing, clean energy procurements based on the results from the Governor’s Energy Office report in 2021 and 2022.**
- **Set achievable targets for cost effective deployment of technologies such as offshore wind, distributed generation, energy storage and outline the policies, including opportunities for pilot initiatives, necessary to achieve these results.**
- **Undertake analysis and set targets to achieve 100% clean energy earlier than the 2050 goal in statute.**

## **2. Initiate a stakeholder process to modernize Maine’s electric grid**

To meet Maine’s Greenhouse Gas (GHG) emission reduction targets, large portions of the energy used in the Maine economy will need to be converted from higher carbon-emitting sources, like fossil fuels, to electricity—a transition referred to as beneficial electrification—and this electricity must increasingly come from renewable and clean generation sources.

Beneficial electrification in heating and transportation may require significant expansion and investment in Maine’s electricity transmission and distribution system, or electric grid. Effective preparation for increased electricity usage requires a modernized electric grid, grid-management, energy systems, and policies, while ensuring it is done efficiently and affordably.

***Beneficial electrification:***  
*Converting from higher carbon emitting sources, like fossil fuels, to electricity that is increasingly procured from clean, renewable resources will advance Maine’s climate goals.*

The Power Sector Transformation Stakeholder Process will examine and provide recommendations regarding the transformation and planning of Maine’s electric sector to facilitate the recommendations of the Maine Climate Council and achieve Maine’s GHG reduction requirements and clean energy goals.

The process will be managed by the Governor’s Energy Office (GEO) in coordination with the Maine Public Utilities Commission (MPUC). Areas for analysis should include: utility structure, load management, data and information access, non-wires alternatives (NWA) and distributed energy resources, efficient and equitable cost allocation, regional collaboration, and changes in law and regulation.

**Outcome: By 2022, Maine will establish a stakeholder process to examine and provide recommendations regarding transformation, modernization and planning of Maine’s electric sector to address and facilitate the recommendations of the Maine Climate Council.**

## **3. Accelerate the decarbonization of industrial use and processes**

Industrial facilities in Maine have historically shown strong and active participation in energy conservation programs, and there are additional cost-effective opportunities that could be pursued. Expanding programs like the industrial energy efficiency program offerings through Efficiency Maine will encourage corporate investments in efficiency, result in more competitive manufacturing businesses, and support reduce emissions.

Achieving deep emissions reductions in this sector will likely require significant shifts away from carbon-intensive fuels to cleaner alternatives. Some fuel switching opportunities can be both cost-effective and reduce greenhouse gas emissions, such as converting from use of fossil fuels to natural gas and increasing efficiencies through use of Combined Heat and Power (CHP). Many industrial facilities in Maine have made those transitions over the last several decades. Other opportunities, such as shifting to renewable gas or oil (e.g., hydrogen rich fuels produced using renewable energy electrolysis or using carbon capture and sequestration) are not close to being commercially available and competitive but may be in the future.

In an effort to stem future industrial emissions increases, and find pathways for long-term reductions required for 2050 goals, especially through innovation, the Maine Climate Council should create an Industrial Task Force (sub-group) of Climate Council members with interest and expertise, and outside stakeholders, to focus on solutions to manage industrial emissions over time, while supporting continued economic growth from this important sector.

**Outcome: Launch an Industrial Task Force to collaboratively partner with industry and stakeholders to consider innovations and incentives to manage industrial emissions through 2030 and reduce total emissions by 2050.**

#### **4. Encourage Highly-efficient Combined Heat and Power Facilities**

Highly efficient Combined Heat and Power (CHP) facilities capture heat from electricity generation to provide steam or hot water for use in space heating and cooling, water heating, and industrial processes to increase overall facility efficiency. CHP both reduces energy loss and reduces the need for additional energy to accomplish heating and industrial processes. CHP can both reduce Maine's emissions and support existing industrial businesses and large organizations.

Maine should continue to support the growth of highly efficient CHP facilities through the Maine Public Utilities Commission (Maine PUC) long-term contracting authority.

**Outcome: Conduct further analysis to consider the incentives, including the potential for long-term contracts, for needed to advance additional highly efficient combined heat and power (CHP) production facilities if they achieve significant net carbon reductions compared to the baseline.**

## Part 2: Prepare for Climate Change Impacts

Even as Maine reduces our greenhouse gas emissions to help reduce climate change, we must prepare for the impacts we have already begun to experience.

### **Strategy D: Build Healthy and Resilient Communities**

- 1. Provide assistance and funding for community resilience**
- 2. Adopt official sea level rise projections**
- 3. Update land use planning and legal tools for resilience**
- 4. Expand public health monitoring, education, and prevention**

The state will support Maine communities in being proactive about understanding climate risk, and provide regional and municipal support for both planning and actions designed to safeguard their citizens from the broad impacts of climate change. Multiple aspects of climate change impacts will be considered including emergency management, economic development, public health, transportation systems, energy systems, and infrastructure.

#### **1. Provide assistance and funding for community resilience**

Communities are already coping with a variety of difficult and threatening challenges. Some are climate-related, others like COVID-19 are not. To thrive within continuous change and multiple, overlapping crises, communities must become proactive in understanding their risks, planning, and taking actions to safeguard their citizens.

“Resilience” will have different meanings to different communities, but generally the foundation of community resilience includes: 1) planning and decision-making processes that absorb information about climate and health risks and evaluate options for action; 2) individuals, committees, or offices in municipal government who are responsible for planning, implementing, and monitoring the activities that reduce climate risk, improve health, and build the community’s capacity to manage crises; and 3) community dialogue and participation that ensures the voices and needs of the most vulnerable citizens are elevated and prioritized.

If communities can make progress on these foundations, they may also become better prepared to manage unexpected challenges like pandemics and economic crises.

State government’s current capacity for assistance and financial support to towns is significantly undersized compared to the need and falling particularly short in supporting inland towns. Lack of capacity, expertise, and funding are consistently cited by municipalities as reasons why they are not able to address their climate risks. Only 11% of communities in Maine have a town planner on staff, while 72% have no local planner and insufficient or no regional planning support.

Enhanced coordination of assistance and funding for community resilience will require meeting the needs of Maine's diverse communities, including small towns, large cities, coastal and inland communities. This includes making consistent and actionable climate data, tools, and guidance accessible; guiding and incentivizing towns toward activities that enhance community resilience; and funding the planning, implementation, and performance evaluation of resilience activities.

An important component of this assistance is the expansion of guidance products that help communities evaluate climate risk, understand their options, and prioritize actions. The program should ensure that the lowest capacity and most vulnerable communities are able to participate. Maine should leverage the advantages offered by regional forms of assistance as well as non-governmental partners from academia, nonprofit organizations, and the private sector.

**Outcome: By 2025, Maine will provide robust technical assistance and funding to communities to build resilience to climate change.**

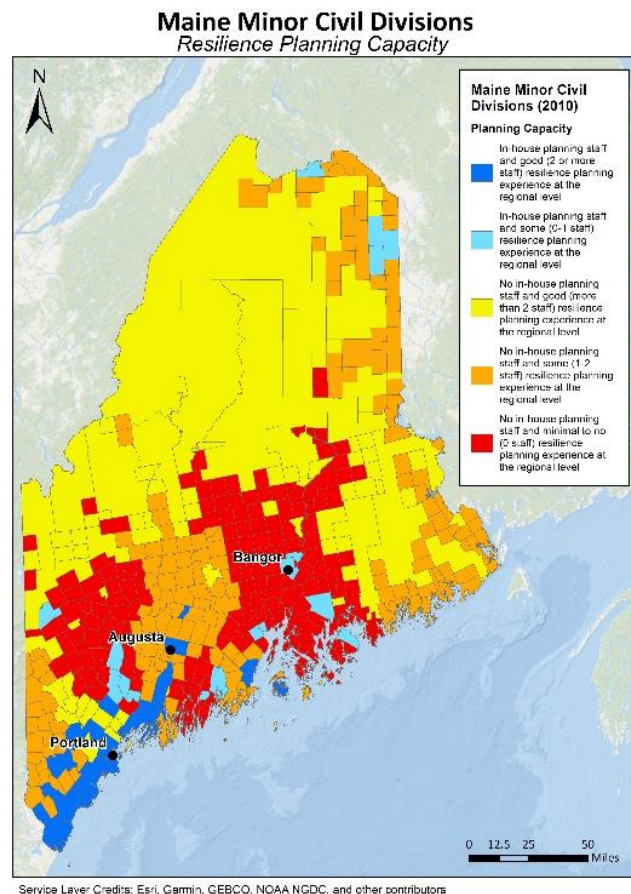
## 2. Adopt official sea level rise projections

Official projections for sea level rise will give agencies, municipalities, and the private sector clear guidance for waterfront planning, development, risk reduction, and conservation. The guidance will include best-estimate projections for 2050 and 2100, as well as worst-case scenarios that are important for decisions about long-lifespan infrastructure and facilities that are critical for public safety and local economies.

The Science and Technical Subcommittee has recommended official sea level rise projections to the Maine Climate Council that should be utilized in state planning and regulatory processes. The adopted projections should be automatically updated every four years to account for the latest scientific understanding of sea level rise drivers.

The Scientific and Technical Subcommittee recommends that the Maine Climate Council consider *committing to manage* for 1.5 feet of relative sea level rise by 2050, relative to the year 2000, and 3.9 feet of sea level rise by the year 2100.

Additionally, the STS recommends that the Climate Council consider *preparing to manage* for 3.0 feet of relative sea level rise by 2050, and 8.8 feet of sea level rise by the year 2100.



**Outcome: By 2022, Maine will adopt official sea level rise projections, incorporate those projections into regulations, and require regular updates to ensure the projections utilize the latest data and science.**

### **3. Update land use planning and legal tools for resilience**

An update of land use laws, tools, and practices will give communities the tools they need to build resilience, enhance ecosystem services, and get out of harm's way. Maine is a home rule state, which in a climate context means that municipal governments have the authority and responsibility for planning and implementing most activities for community resilience. In Maine's unorganized territories, the state's Land Use Planning Commission serves the planning function.

The tools communities currently use – including comprehensive planning, zoning, site location of development, and stormwater and floodplain management laws, ordinances and regulations – were not designed with climate change in mind. They need be updated to:

- Consider climate hazards like sea level rise
- Leverage nature-based solutions
- Contain more consistent and scientifically sound definitions
- Provide more utility to communities for building climate resilience
- Support development and economic activity in areas less vulnerable to climate impacts.

The state should lead a process to update Maine's land use laws, tools, and practices to address the threats communities face from climate change impacts. The update process must include significant stakeholder participation, especially from vulnerable communities. The rollout of updates must be coordinated with technical assistance, training for planners and code enforcement officers, and incentives.

Significant additional work is needed by the state, led by the Maine Climate Council and its working groups, in conjunction with stakeholders, legislators, and the public, to develop guidance that helps the state and communities grapple with two additional long-term land use planning and climate questions:

- 1) How to get people out of harm's way and equitably locate or relocate development in safer areas and;
- 2) How to anticipate growth, development, and economic opportunity as people migrate to Maine seeking refuge from severe climate impacts affecting other parts of the country.

**Outcome: By 2025, update Maine's land use laws and practices to improve resilience to flooding and other climate impacts.**

### **4. Expand public health monitoring, education, and prevention**

As COVID-19 has demonstrated, the ability to assess and understand the current state of wellbeing in our communities is critical to forming an effective response to stressors that threaten individual and collective health. And like COVID-19, climate change intensifies risks for socially vulnerable populations who have fewer resources to alleviate their hardship. Several key public health strategies are recommended:

**Monitoring:** Robust monitoring of public health impacts from climate change should: monitor for air allergens, particulate matter, and ozone; monitor for water-borne diseases, harmful algal blooms, and emerging threats in large lakes and public water supplies; monitor for vector-borne diseases from ticks and mosquitoes; and collect, analyze, and report these data disaggregated by age, race, ethnicity, gender, disability, geography, and other demographic factors to identify impacts on socially vulnerable populations and, accordingly, make interventions.

**Education:** Improved monitoring systems feed information into education and outreach that will raise public awareness and help Maine people understand why it is important to protect themselves and their families. Expanding public education about how climate change affects health and the resources available will help communities manage risks.

Education efforts include: air quality alerts, high heat and cold warnings, water contamination and health advisories, private well water testing, and awareness building of water- and vector-borne diseases.

**Prevention:** Nearly half of Maine people are served by public water systems that rely on surface water bodies like lakes and rivers as the source of drinking water (Maine CDC, 2018 Drinking Water Program Report). Every \$1 spent on source water protection saves \$27 in future water treatment costs (US EPA, Economics and Source Water Protection, 2012), so there is an enormous financial advantage to taking proactive actions that prevent contamination.

To safeguard public health against water-related climate hazards, Maine should protect drinking water sources and downstream water bodies by: regulating activities in watersheds that supply drinking water; encouraging best management practices and low impact development; separating storm and sewer collection systems to prevent future sewage discharges into bays, estuaries, and rivers where contact with humans or shellfish is likely; and identify public water systems in danger of contamination by flood inundation due to climate change.

**Outcome: By 2025, Maine will have developed robust public health monitoring, education, and prevention practices to achieve better health outcomes against climate change impacts.**

## **Strategy E: Invest in Climate-Ready Infrastructure**

- 1. Complete state-wide infrastructure vulnerability assessments and provide climate-ready design guidance.**
- 2. Launch a State Infrastructure Adaptation Fund and provide pre-development assistance.**

Maine must improve the climate readiness and resilience of infrastructure so that it serves Maine better under day-to-day conditions and functions reliably during emergencies.

Functioning infrastructure is a basic requirement for public safety and health, thriving state and local economies, and the flow of people, goods, and information. Much of Maine's infrastructure was constructed well before climate change was understood as a threat. It is no surprise, then, that climate change is already having a negative impact on our roadways and bridges, working waterfronts, water treatment facilities, and utilities.

Aging infrastructure is both a burden on the state as well as an opportunity. Investing in climate-ready infrastructure increases day-to-day functional capacity and, during an emergency, can improve performance and survivability of the asset or network.

New and upgraded infrastructure must be designed to withstand the conditions expected over a decades-long lifetime. Otherwise, any modest cost savings today are purchased at the expense of much higher repair and replacement costs in the future, not to mention the public safety, health, and economic losses incurred when infrastructure fails.

For twenty-five years the National Institute of Building Sciences has reported that for every \$1 invested in disaster mitigation results in \$6 of avoided disaster damages. With increasingly pace of devastating and expensive disasters, the current disaster-rebuild cycle is increasingly unsustainable. An improved model for investing in resilient infrastructure is needed.

- 1. Complete a state-wide infrastructure vulnerability assessment and provide climate-ready design guidance**

Maine's state agencies, municipalities, and industries need a clear understanding of the risks to infrastructure assets posed by climate change. Not only is this a requirement for responsible planning and investment of taxpayer dollars, the major credit rating agencies are beginning to consider how well states and municipalities are anticipating climate risks when assigning credit ratings. Failure to understand and incorporate climate risk can increase the borrowing costs for the state and towns, making infrastructure projects even more expensive.

Statewide vulnerability assessments will be conducted for: transportation infrastructure (including roads, bridges, culverts, airports, railroads, ferries, ports and wharfs, maintenance facilities, and public transit systems); water infrastructure (including drinking water systems, wastewater treatment facilities, and dams and stormwater management assets); energy infrastructure (including electricity generation, storage, and transmission; and fuel supply infrastructure); communications infrastructure (including landline, mobile, and broadband); and community infrastructure (health systems, public housing, state and municipal buildings, food systems, solid waste systems, etc.).

Vulnerability assessments should provide an understanding of: 1) The climate hazards to which infrastructure assets are exposed, the likelihood of that hazard occurring, and how the intensity and



likelihood of those hazards may change over time; 2) the asset’s susceptibility to damage or failure given its location, design, age, condition, and state of repair; and 3) the consequences that impairment or failure of the asset will have on public safety and health, state and local economies, and the environment and natural resources.

The assessments should identify “critical infrastructure” assets that are important for public safety and health. Assessments should also give particular attention to areas of the state where socially vulnerable communities and vulnerable infrastructure overlap. These are communities whose struggle to recover may be improved by reliable and resilient infrastructure.

The vulnerability assessments will inform state and local adaptation strategies and capital investment plans. A maintenance database will track improvements and climate hazard impacts. Resilient design guidance and standards for different infrastructure types will be developed and should include nature-based solutions. Agencies, supporting organizations, and the private sector should continue research into construction materials and green infrastructure options that increase durability and resilience to climate hazards, and consideration should be given to nature-based solutions wherever possible.

**Outcome: By 2025, assess the vulnerability of Maine’s infrastructure to climate hazards and develop resilient infrastructure design standards.**

## **2. Launch a State Infrastructure Adaptation Fund and provide pre-development assistance**

Maine’s municipalities and state agencies all struggle to fund infrastructure projects. Maine currently has a backlog of 1,798 infrastructure adaptation projects listed across all sixteen counties at a proposed cost of \$325 million. While there are significant federal resources available, federal grant programs generally require cost-share or “matching” funds from state or local governments.

A new **State Infrastructure Adaptation Fund** will help municipalities and state agencies meet these cost-share requirements, unlocking new federal funds for infrastructure projects. Because the cost-share requirements are frequently 10 to 25 percent of the total project cost, a relatively modest investment of state funds would result in leveraging four to ten times more federal funding.

Building a pipeline of infrastructure projects that are shovel-ready for federal support or private investment is important. And this kind of support could be essential when it comes to competing for one-time federal programs designed to support recovery and infrastructure investments.

To make a project shovel-ready, pre-development assistance is typically needed which includes resilient design, engineering, and permitting; grant writing and grant management; and, in some cases, matchmaking with investors in public-private partnerships.

In both funding and predevelopment assistance, attention must be directed toward communities where high social and climate vulnerability overlap with low capacity to develop project pipelines and limited access to funding. Working waterfront protection must also be an area of focus, given that they are among Maine’s most threatened infrastructure.

**Outcome: In 2021, launch a State Infrastructure Adaptation Fund and pre-development assistance program, designed to leverage federal recovery support in the short-term, and in the long-term to address the significant and ongoing infrastructure adaptation needs of the future.**

## **Strategy F: Protect Maine's Natural and Working Lands and Waters and Promote Natural Climate Solutions**

- 1. Protect Maine's natural and working lands and waters**
- 2. Increase carbon sequestration from natural and working lands and waters**
- 3. Provide information, technical assistance, and outreach to land-based, coastal, and marine stakeholders**
- 4. Improve monitoring to understand and manage the response to climate change**

Maine's natural and working lands and waters, including forests, farms, wetlands and coastal and marine areas, play an essential role in capturing and storing carbon from the atmosphere, sequestering an amount equivalent to at least 75% of Maine's annual emissions. They hold a tremendous potential, especially with greater focus and investment, to sequester even more carbon, making them a significant asset towards accomplishing Maine's goal of carbon neutrality by 2045.

In addition to their carbon sequestration benefits, natural and working lands and waters provide clean drinking water and important wildlife habitat and help to moderate flooding events. They also support Maine's vital fishing, farming, forestry, recreation, and tourism industries.

Climate change is already affecting Maine's natural and working lands and waters. Loss of Maine's natural land and working lands to development (currently estimated at approximately 10,000 acres lost per year) is a direct source of carbon emissions and reduces the potential for carbon storage and the many additional benefits those areas provide. Maine's coastal and marine areas are threatened by sea level rise and other climate change impacts, and may turn from carbon sinks to carbon sources if they cannot be protected.

### **1. Protect Maine's natural and working lands and waters**

Conserving forests through working forest conservation easements is one of the more cost-effective strategies to help reach carbon neutrality, ensure timber harvesting and keep forests as forests. Conserving agricultural lands from development is critical to ensure that these important limited resources remain available for future farming, contributing to Maine's rural economies, food security, and carbon sequestration.

A dedicated, sustained funding source to increase land preservation will increase the permanent protection of working forest land and farmland, and conserve and restore areas with high biodiversity value that support habitat connectivity, ecosystem health, and climate change resilience.

Updating and refocusing state programs, policies, and financial incentives to address climate change mitigation and resilience can also help to protect Maine's natural and working lands. This includes continuing and updating climate-friendly public land management practices to incorporate current climate science, support landscape and species resiliency, and ensuring appropriate renewable energy project siting. It also requires revising scoring criteria for state and federal land conservation funding sources to incorporate climate mitigation and resiliency goals into grant criteria and project selection; and addressing land taxation to incentivize climate-friendly land management practices and forest management and conserve parcels with high biodiversity value.

To protect and conserve our coastal and marine ecosystems and communities from the impacts of climate change, Maine should promote nature-based solutions. Nature-based solutions (also known as natural infrastructure or green infrastructure) provide effective and lower-cost protection for climate change related challenges while restoring coastal and marine habitats. Types of nature-based solutions that should be prioritized include:

- Protect and restore sand dunes, seagrasses, and tidal marshes that act as natural barriers to waves
- Restore floodplains, wetlands, and streams
- Update design guidance for culverts and bridges to provide effective stormwater management, flood control, and habitat connectivity
- “Living Shorelines” projects, constructed with plants, oyster shells, and other natural materials that protect against coastal erosion.

**Outcome:**

- **By 2030, conserve at least XX% of natural and working lands that would otherwise be developed.**

**2. Increase carbon sequestration by conserving and restoring land and ocean habitats that naturally store carbon**

Maine’s forests and wood products sequester enough carbon annually to equal approximately three-quarters of Maine’s annual greenhouse gas emissions. Increasing the permanent protection of forest land and farmland through conservation easements is the most effective way to protect Maine’s natural and working lands and maximize their potential to store carbon.

To further increase carbon storage and encourage forest management while maintaining current timber harvest levels, Maine should launch a stakeholder process to develop a voluntary, incentive-based forest carbon program (practice and/or inventory based) for woodland owners of 10 to 5,000 acres and forest practitioners.

Maine’s approximately 5,000 miles of total coastline provides an additional, unique opportunity to store carbon long-term, while also providing benefits such as protecting ocean water quality, providing important wildlife and fisheries habitat, protecting coastal properties from erosion and flooding, and providing recreational opportunities. Maine should determine where and how much carbon can be stored by conducting a comprehensive coastwide survey of coastal environments like salt marshes, seaweeds, and seagrass beds. Maine can maximize carbon sequestration in coastal and marine environments, also known as blue carbon, by conserving and restoring tidal salt marsh, eelgrass, and seaweed habitats.

The state should explore the opportunity for formal blue carbon sequestration incentives or carbon permit program to encourage blue carbon habitat conservation and restoration. Marsh and eelgrass restoration are moderately less cost-effective in terms of carbon sequestration relative to some other sequestration strategies, but they provide a range of other essential ecosystem services. Thus, blue carbon projects should be implemented based on where they can maximize ecosystem service values.

**Outcome:**

- **Maine should support the development of state or regional carbon sequestration programs targeting forest and agricultural lands and practices, and blue carbon opportunities.**
- **By 2025, Maine should conduct a comprehensive, coast-wide inventory of coastal and marine “blue carbon” resources to inform baseline estimates of current storage and sequestration and track changes in sequestration and emissions from blue carbon habitats over time.**

**3. Provide information, technical assistance, and outreach to land-based, coastal, and marine stakeholders**

Providing information, technical assistance, and outreach to land-based, coastal, and marine stakeholders can help protect Maine’s natural and working lands and waters from the impacts of climate change.

Technical assistance to towns, land trusts, land managers and landowners will support efforts to protect native species, conserve land and waters, and address climate-related threats such as invasive species.

A Coastal and Marine Information Exchange will provide accessible and relevant information and decision support to facilitate climate mitigation and adaptation in Maine’s coastal communities and industries.

**Outcome: By 2025, Maine will increase state technical assistance capacity for land-based and coastal and marine stakeholders and launch the Coastal and Marine Information Exchange.**

**4. Improve monitoring to understand and manage the response to climate change.**

We cannot make our communities, and industries resilient to climate change impacts without understanding what is changing, how changes are likely to continue, and what measures work best to address the impacts of climate change.

A coordinated climate change research model and funding strategy (including public, private, education, and non-profit sectors) will support innovation and informed decision-making.

Substantial climate change data are already being gathered. However, efforts are often poorly coordinated, and chronically underfunded, resulting in significant remaining data gaps. Maine should develop a model for gathering these data and a system for disseminating them widely so public and private sector decision makers can respond constructively to climate change impacts.

In particular, research and development of greenhouse gas mitigation and adaption land practices will support Maine’s agriculture and forestry sectors, including how to maximize the capacity of trees, forest soils, agricultural soils, and coastal environments to sequester carbon. There are significant research needs associated with the development of new wood-based products as well as continued development and planning efforts supporting the growth and stability of Maine food systems.

For coastal and marine stakeholders, characterizing, mapping, and tracking marine and coastal habitats, species, including economically important, at-risk, and invasive species, and water quality will inform

climate-adaptive, ecosystem-based management; planning; and conservation and restoration priorities. Alongside monitoring of environments and species, Maine should improve tracking of economic and social conditions in Maine's coastal communities, especially as it relates to changes in essential industries like fishing and tourism.

The Maine Climate Council's Scientific and Technical Subcommittee identified critical research and monitoring gaps that should be filled to allow Maine to understand and plan for effective responses to climate change. They include:

- Historical and predicted climate conditions and extreme weather events and impacts for Maine, and research to determine the vulnerability of Maine's species and habitats and identification of priority areas for conservation.
- A comprehensive Maine carbon cycle analysis will allow the State to understand and track its progress towards carbon neutrality and potentially participate in carbon offset markets.
- Detailed benefit/cost analyses of climate mitigation and adaptation strategies for all sectors of the economy, including impacts on equity.
- Improving riverine flood maps and predictions to allow for towns to better adapt to changing conditions as our climate changes, and further understanding of the impacts of climate change on marine coastal flooding, such as the impacts of increasing precipitation, storm tracks, sea level rise, storm surge, and coastal erosion and flooding.
- In the marine realm, continuing and improving measurements of ocean conditions, sea level rise and nuisance flooding, and monitoring for temperature, oxygen and ocean acidification.
- Research into the responses and adaptive capacity of species at the base of marine ecosystems and those that are economically important, to changing temperatures, ocean acidification, deoxygenation, and other environmental variables.
- Monitoring priorities include air quality, water- and food-borne disease monitoring, as well as continued disease vector surveillance (e.g., ticks and mosquitoes). Improved freshwater and marine water quality monitoring will allow us to better understand and respond to Harmful Algal Blooms (HABs) and other water quality issues.

**Outcomes:**

- **Outcome: By 2025, establish a coordinating hub with State and non-State partners for key climate change research and monitoring work to facilitate state-wide collaboration**
- **By 2030, establish a coordinated, comprehensive coastal and marine monitoring system**

## **Strategy G: Grow Good Jobs, Maine's Clean Energy Economy, and Protect Maine's Natural Resource Industries**

- 1. Support Maine's natural resource economies to adapt to climate change impacts and opportunities**
- 2. Grow clean energy jobs and businesses in Maine through innovation, business support, and increased workforce education and training**
- 3. Prepare shovel-ready infrastructure projects to revitalize Maine's economy**

Maine must support our businesses and industries as they seek to adapt to the impacts of climate change, including new economic opportunities that stem from a focus on sustainability and a transition to clean energy and efficiency.

Maine's renewable energy goals also present new economic opportunity for our state. A strong clean energy economy that includes the development and sustained operations of renewable energy resources and energy efficiency services will reduce emissions and create good paying jobs, especially when paired with opportunities for workforce education and training. A growing clean energy economy will also generate economic development growth, while decreasing expenditures that are sent out-of-the-state for the purchase of imported fossil fuels.

Opportunities to add value to Maine's natural resource-based industries offers significant growth potential for the state's economy. From biobased products to new construction materials made from wood to increased food production from Maine's farmers, fishermen and aquaculture, Maine can grow new and legacy industries and help meet climate goals at the same time. In addition, the preservation of both working lands, and wildlife and natural lands, also supports the continued growth of Maine's outdoor tourism economy which relies on natural lands and thriving wildlife.

Lastly, investments to prepare our communities and infrastructure for climate change impacts will create thousands of good paying jobs in the engineering, design, and construction sectors. Shovel-ready projects can help revitalize Maine's economy in the short and long-term, while also making our communities and state infrastructure systems more resilient.

### **1. Support Maine's natural resource economies ability to adapt to climate change impacts and opportunities.**

Maine's fishing and aquaculture, farming, and forestry industries need information and technical support and tools to adapt to the rapidly intensifying impacts of climate change and take advantage of new opportunities. Technical assistance and financial incentives to help Maine businesses prepare for the impacts of climate change will build resilience within Maine's natural resource industries, while also helping to sequester more carbon in Maine's natural and working lands and waters.

#### **Fisheries and Aquaculture**

Maine should provide clear information, forecasts, and tools about climate change impacts that is relevant to business planning, operations, and management in our fisheries and aquaculture sectors.

This includes for example, closely monitoring species and habitat changes and providing information about ocean temperature, salinity and acidity changes at the local level.

Managing for resiliency of Maine's marine fisheries and aquaculture industries in the context of climate change adaptation includes both market support for business resilience, as well as regulatory and policy changes.

A proposed Maine Seafood Business Council will work with Maine's seafood harvesters, shoreside businesses, and working waterfronts to provide them with access to information and tools to support operational decisions, capital investments, and long-range planning to implement climate adaptation and mitigation strategies.

To support diverse markets for Maine fishermen and aquaculture businesses, Maine should expand local and direct marketing opportunities for sustainably produced Maine seafood. State support for the growing aquaculture sector can serve to increase Maine seafood production, provide important economic opportunities for coastal communities, while also harnessing potential acidification mitigation and other environmental services -- especially with crops like seaweed, kelp, and shellfish. Technical assistance, financing tools and policy strategies will be needed to help fishing and aquaculture businesses plan for and transition activities in a changing ocean ecosystem.

Maine should continue to evaluate and implement changes to Maine's fishery and aquaculture laws and regulations that provide the opportunity to address environmental change and emerging fisheries. And with both federal regulation and co-management roles, partnership and advocacy in regional and federal contexts will also be required.

### **Forestry**

Support for landowners, loggers, and land managers through state and partner outreach, education and technical assistance is needed. This includes support to adopt carbon-friendly and resilient land management practices for timber management and soil health, encouraging high quality on-the-ground performance by loggers, facilitating the use of low-impact timber harvesting equipment, and providing assistance to prepare for emerging land management threats, such as pests, diseases and invasive species.

### **Farming**

Increased technical assistance resources and programs can help Maine farmers adapt to climate-driven growing season and will support farms' ability to prepare effectively for more frequent and extreme weather events. Federal and state agricultural programs should prioritize natural climate solutions such as soil health practices. Financial incentives and infrastructure programs should be designed to support private land management and agricultural and forestry mitigation and adaptation practices. These should include funding to incentivize energy upgrades such as on-farm renewable energy use and reduction of both fossil-fuel usage and other reduced agricultural emissions.

Maine should also increase financial support to strengthen Maine's food systems, so that more food can be produced and processed locally, and distributed efficiently and affordably. This is key to supporting Maine farmers and food producers and supporting resilient Maine communities.

## Outcomes:

- **Fishing: Launch Maine Business Seafood Council by 2022**
- **Forestry: Maine grows its forest products industry from XX B to XXB, meeting goals for industry growth and ensuring well-managed forested lands stay forested.**
- **Farming: Maine's local food system development increases the amount of food consumed from Maine farmers and harvesters from XX% to XX%.**

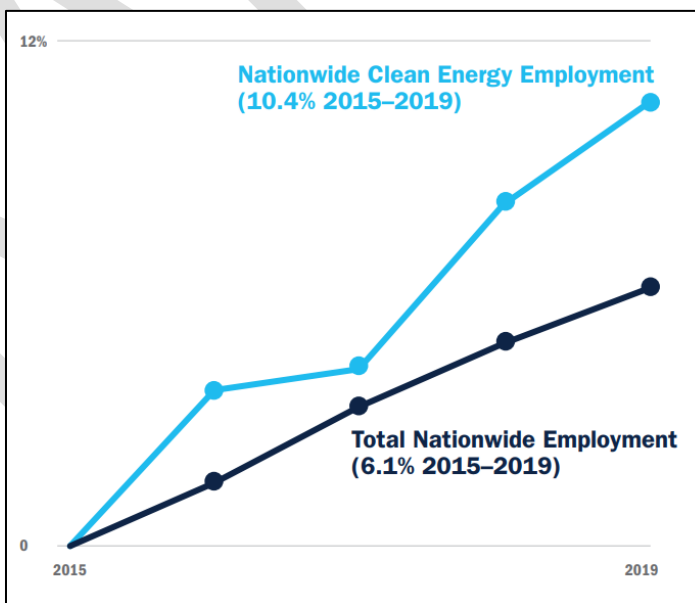
## **2. Grow clean energy jobs and businesses in Maine through innovation, business support, and increased workforce education and training**

Maine's climate goals and renewable energy policies mean that our clean energy sector is poised for robust growth. To maximize the significant jobs and economic benefits for Maine, specific strategies are needed to advance the state's clean energy sector and support economic recovery efforts.

The plan, *Strengthening Maine's Clean Energy Economy*, highlights the potential, "With Maine projected to lose employment over the coming decade due to demographic trends that will see a large swath of the workforce enter retirement age, development of the clean energy sector is not only a powerful immediate move to address the disruption of COVID-19, but a long-term strategy for attracting, retaining and growing Maine's workforce to combat this forecasted trend."

Nationwide, the clean energy sector has added jobs at a rate 70% faster than the rest of the US economy between 2015-2019.<sup>1</sup> However, Maine's clean energy workforce growth has lagged our New England neighbors. Three of the top-5 states in the nation for clean energy jobs per capita today are in New England – Vermont, Massachusetts, and Rhode Island – while Maine, according to one national study, ranks 44th in the nation in total clean energy workforce.

Prior to the pandemic, in 2020, nearly 8,900 people were employed in energy efficiency jobs, with roughly the same number of people employed in traditional energy jobs including electric power generation, fuels, and transmission, distribution and storage combined.



The plan recommends that Maine commit to increasing its current clean energy workforce, while establishing new supply chains for Maine-based manufacturers to create sustained, good-paying skilled labor jobs across the state.

<sup>1</sup> E2. *Clean Jobs America 2020: Repowering America's Economy in the Wake of COVID-19*. April 2020. Retrieved from <https://e2.org/wp-content/uploads/2020/04/E2-Clean-Jobs-America-2020.pdf>



Training and recruiting a skilled workforce are among the key components needed to support Maine's transition to a clean energy economy, as highlighted by Maine's 10-year economic strategy. By supporting educational and training paths for Maine people to find new careers, and attracting a talented, diverse workforce to Maine, the clean energy economy has the potential to create new, sustained opportunities in sectors such as solar, offshore wind, bioproducts and energy efficiency that are poised for major growth in the coming decade.

Recommendations to support the growth of Maine's clean energy economy and workforce growth include:

- **Continue to create and implement clean energy policies that are clear and consistent, provide certainty for ongoing development, and specifically focus on creating quality jobs;**
- **Attract and develop the workforce required for Maine's clean energy future with the following initiatives:**
  - Support and promote Science, Technology, Engineering, and Math (STEM) education, Career and Technical Education (CTE) and Maine Community Colleges to provide pathways for Maine youth and residents to find fulfilling and quality job opportunities.
  - Promote and encourage training opportunities and industry participation as an avenue for skilled jobs to benefit participants as well as employers.
  - Prompt industry to provide their own training or associated apprenticeship programs and job opportunities in coordination with existing training programs and needs.
  - Support existing programs and incentives, identify gaps, and develop new programs, as needed, to create opportunities that assist and incentivize the Maine workforce in growing the clean energy sector.
  - Launch a workforce initiative (led by the GEO and in partnership with the private sector) that: (a) creates an online database and resource for connecting job opportunities in clean energy with potential hires in order to streamline the job search process, and identifies training and educational opportunities, and (b) establishes ongoing stakeholder coordination between industry and educational and training organizations to understand and support future workforce needs.
- **Support a growing clean energy innovation ecosystem, by increasing investment dollars from the public and private sector for climate and clean energy focused products and services.** By increasing investment in cleantech innovation, Maine can support the development and commercialization of innovative products and services. State programs should find ways to incentivize enhanced public investment in companies that advance the state's climate and clean energy goals.
- **Invest in broadband expansion** in order to support business success and growth, as well as to provide the platform for innovative clean energy and grid management solutions. Achieving the state's goal of 95% broadband deployment by 2025, and striving to serve 99% of the state by 2030, at the latest, will support Maine's growing energy economy.

- To ensure **equity of job opportunities, affordable energy, and public health benefits across the state, as well as just transition considerations** for those who may face adverse impacts as the state transition to a clean energy economy,
  - Include equity and cost considerations in the support and development of energy programs, particularly those targeted at low to moderate income households, to aid in decreasing overall energy burdens and support the shift towards low-carbon heat and energy sources.
  - Support policy solutions that ensure fair distribution of benefits within the state and access to those associated benefits across all communities.
  - Identify opportunities to create programs that will assist traditional energy companies in transitioning to clean energy economy opportunities.

**Outcomes: To be added**

**3. Prepare shovel-ready infrastructure projects to revitalize Maine's economy**

This plan has highlighted the many critical infrastructure projects related both the energy sector or adapting to and reducing climate change impacts. Many projects do not have the necessary funding. As described in the strategy to Build Healthy and Resilient Communities, this includes a backlog of \$325 million in infrastructure projects that local communities have identified to reduce disaster risk. These projects are ready to build if funding became available and would create design, engineering and construction jobs. Much-needed pre-development assistance will help ensure that infrastructure projects are made shovel-ready for state or federal support including design, engineering, and permitting; grant writing; and matchmaking with investors for public-private partnerships.

**Outcomes: Maine has identified a pipeline of shovel-ready infrastructure projects in early 2021 and then updated for long-term management.**

## **Strategy H: Engage Maine People and Communities in Climate Impacts and Program Opportunities**

1. Increase communication about climate change impacts and opportunities to engage in solutions
2. Increase public education on climate science and clean energy education pathways
3. Establish a Maine Climate Corps for climate-related workforce development
4. Highlight leadership on climate issues among Maine businesses and organizations

Effective communication about Maine’s climate strategies will be critical to the success of the Maine Climate Action Plan. Highlighting leadership and innovation can help people better understand the challenges, and the opportunities. Maine students should understand the science of climate change, and be prepared with the necessary skills to meet future workforce opportunities

### **1. Increase communication about climate change impacts and opportunities to engage in solutions**

Regular communication with the public and stakeholders about the impacts of climate change and progress on climate strategies is critical to the implementation of Maine’s climate action plan. The state will develop a dashboard for key indicators and regular communications about climate council activities, and provide clear, easy access to information about climate policies and programs.

Creative and diverse means of communication should also be employed to promote state climate programs, incentives, and opportunities. Partnerships with business groups, non-profits, municipalities, and community groups will help spread key messages. Multiple forms of communication, and ongoing efforts will be necessary to support the state’s aggressive climate goals.

Communications should also include translated materials into multiple languages for diverse audiences, using infographics in addition to text. Additionally, partnerships with community groups and organizations known as trusted resources can help reach vulnerable populations.

**Outcome: Multiple, diverse and ongoing communications will be required from both the state and trusted leaders and organizations to ensure information about climate, Maine’s climate actions, and available programs and resources. Effective communications should start with the launch of the plan and continue.**

### **2. Increase public education on climate science and clean energy education pathways**

New existing Maine education standards for K-12 students launched in 2019 include climate change science information, and many more performance expectations that contribute to foundational understandings required for learning climate change science. The Maine Department of Education is currently in a multi-year process of standards implementation with Maine teachers. DOE recently received funding (\$16.9M) from the U.S Department of Education to strengthen statewide capacity for innovation in remote education which focus areas in outdoor education and multiple and flexible pathways, including pathways that lead to clean energy employment opportunities.

Other opportunities include existing partnerships with Nature-Based Education Consortium, Maine Math and Science Alliance, Maine Environmental Education Association, Maine Science Festival, Gulf of Maine Research Institute and other science and education institutions. Maine has also joined the U.S. Department of Education's Green Ribbon School's initiative to promote and recognize school, district or institutional efforts to make responsible improvements to sustainable and green practices on campus and to increase awareness of environmental impacts.

Student and teacher groups have petitioned the Maine Climate Council for increased energy and climate education programs. Partnerships with school districts, philanthropies, and youth-led groups should be enhanced to meet student needs and support expanded programming.

STEM education (science, technology, engineering and math), secondary career and technical education (CTE) programs, and higher education pathways should be expanded and connected to available workforce pathways in current and emerging climate and energy fields.

**Outcome: Maine will increase education opportunities related to climate change in our public education systems.**

### **3. Establish a Maine Climate Corps for climate-related workforce development**

With collaboration from existing service-learning organizations (like Volunteer Maine and Americorps), establish a Maine Climate Corps or Clean Energy Corps to support climate related actions and engagement from recent college graduates. The program should be launched with private and public sector support and Corps members could support mitigation, sequestration and resilience programs. From weatherization actions and education, resilience planning, design and implementation, to land protection efforts or youth climate education – service members could contribute meaningfully Maine's climate progress.

**Outcome: Partner with service-learning organization and non-profit organizations to launch a Maine Climate Corps program by 2023.**

### **4. Highlight leadership on climate issues among Maine businesses and organizations**

Establish a leadership group of leading Maine businesses, non-profits, and institutions to highlight organizations taking climate action to reduce greenhouse gas emissions and address climate change while strengthening Maine's economy. The network will recognize innovation and leadership, establish partnerships, and share best practices.

**Outcome: Launch Governor's Climate Leadership Council in 2021 to increase private sector ambition toward voluntary climate actions.**

# Implementing Maine's Climate Action Plan

## Implementation

Maine's four-year climate action plan must be more than a plan – it requires that concrete action is taken to meet the goals of the plan. Implementation requires lead agencies and partnerships that will hold responsibility for implementation and achieving outcomes. It requires resources to make the actions possible, including the essential but challenging work of identifying long-term funding resources to make sustained action possible. And lastly it requires metrics and accountability – to ensure that progress is occurring, and those metrics are transparent.

The successful implementation of Maine's climate action plan will require broad collaboration across state, local, regional and tribal governments, non-profit organizations and academic intuitions, and the private sector.

(See attachment, **DRAFT IMPLEMENTATION CHART**)

## Ensuring Financial Resources to Accomplish Ambitious Climate Actions

Achieving Maine's ambitious and required climate goals will **require significant and sustained resources, as well as innovative financing mechanisms.**

From an expanded electricity grid that can manage the loads of the future to resilient transportation infrastructure built for an uncertain future, long-term investments will be needed for state and community level needs. Enhanced incentive programs for cleaner vehicles, heat pumps, weatherization, efficiency, and technical assistance will require well-financed programs, and properly capitalized loan entities.

This four-year Climate Action Plan is being released in the context of both a global pandemic and a severe recession, causing state revenues and family budgets to be stretched thin. These same events have revealed the some of the weaknesses of our economy to intense disruptions, especially for Maine's most vulnerable citizens, adding urgency to need for preparing our people, communities, and economy for the increasing disruptions climate will cause in the future.

Investments that build a sustainable economy that is less reliant on global supply chains, imported fossil fuels, and other essential goods - from fresh food to building supplies – will strengthen Maine's economy and families to withstand major challenges in the future.

The Maine Climate Council recognizes that the responsibility for appropriation and revenues rests with the Governor and the Maine State Legislature, and with similar processes at the municipal, tribal, regional, and federal levels. The role of the Council is to provide the roadmap for specific actions that will allow the state to meet its statutory goals.

Maine's Climate Action Plan is not one new program requiring funding. Action will require new programs, public and private investments, and ongoing actions – all intended to lead together to

transformational change to reduce Maine's emissions and prepare our state for climate impacts. Some of these programs currently exist and need bolstering to accelerate their progress, and others require start-up funds, while some actions will require significant, sustained investments over time.

Maine will need to identify a variety of existing and new funding sources, both private and public, and from local, state and federal governments. The plan recommends that Maine develop new financing mechanisms for larger scale transformation, or bolster the scope, expertise, and authority of Maine's existing lending entities. There are a variety of funding and mechanisms that should be considered to make bold action possible that include both immediate and long-term options:

- **Maine should consider ambitious capital investments through state bonding vehicles in 2021 and beyond, including state general fund bonds, as well as consideration of revenue bonding mechanisms.** With record-low interest rates and the opportunity to fund infrastructure projects that will put Maine people back to work, bold capital investments could jump-start Maine's economy and climate plan implementation.

Some urgently needed climate investments include:

- **State infrastructure projects** – from modern transportation deployment to funding the backlog of local wastewater and drinking water projects
  - **Broadband** deployment
  - Start-up of the **Maine Adaptation Fund** to support local and state-wide projects; and leverage significant matching funds for federal grant opportunities
  - **Energy Innovation** support through existing state research and development programs
  - **Renewable Energy, Weatherization and Efficiency, and Clean Transportation Incentives – capital support and loan program re-capitalization**
  - **Natural and Working Lands Preservation and Paired Natural Resource Economy Infrastructure**
- **A sustainable revenue source for a Maine Infrastructure Adaptation Fund** will be needed to support long-term project needs for municipalities, regions and state agencies meet cost-share requirements and unlock new federal funds for infrastructure projects. Much-needed pre-development assistance will help ensure that infrastructure projects are made shovel-ready for federal support or private investment including design, engineering, and permitting; grant writing; and matchmaking with investors in public-private partnerships.
  - Pursue current and new **federal grant opportunities** aggressively to support Maine climate strategies and consider additional state staffing capacity to support federal grant writing and management.
  - **Significant settlement funds** were distributed to Maine as a result of the Volkswagen emissions settlement, and these have provided multi-year capital for electric vehicle rebates and charging infrastructure, transportation pilots, and other emissions reduction efforts. Additional settlement funds may continue to flow to the state from renewable energy and power projects and should be used to fund emissions mitigation elements of the Climate Plan.

- **Support Commercial Property Assessed Clean Energy (C-PACE) program**, a financing mechanism that would help Maine businesses do more renewable energy and energy efficiency projects. C-PACE helps business owners obtain low-cost, long-term financing to pay for eligible energy projects. C-PACE is available in 36 states where legislation has been passed to allow property owners to voluntarily utilize this financing.
- Identify revenue sources for **stable and sustainable transportation funding solutions** that will support essential transportation infrastructure needs and climate transportation strategies like electric vehicle and cleaner car deployment, pedestrian and bicycle infrastructure, broadband expansion, and public transportation to reduce greenhouse gas emissions reductions.

As recommended by the Transportation Working Group, Maine should continue to **monitor the Transportation Climate Initiative (TCI)**, a potential northeast regional initiative to implement a cap, trade and invest system to reduce transportation emissions and generate revenue for clean transportation transitions. TCI is modeled after the Regional Greenhouse Gas Initiative (RGGI) which has successfully reduced CO<sub>2</sub> from the energy sector. Details on TCI have yet to be publicly released and may not be released until late 2020. Maine should continue to evaluate potential short and long-term transportation funding mechanisms to identify the best options for Maine.

Consideration of funding options **that export some of our transportation burden** to the millions of visitors who come to Maine each year who utilize Maine's transportation systems and contribute emissions should also be considered.

- Create the mechanisms necessary to provide loan and creative capital financing to Maine's climate transportation needs for the long-term. Options include launching a new **Maine Green Bank**, based on the successful experience in other states and building on existing clean energy financing programs in Maine. Other options also include utilizing some of Maine's existing finance entities to create a new fund or funds, which would require growing the finance capacity with both new capitalization and expertise. A green bank or fund could leverage significant, low-cost private sector capital to finance clean energy projects, climate initiatives, and infrastructure. Banks or funds require initial capital investments to support growth, and may require additional funding, revenue sources, or capital raises. Other states have funded these entities with bond proceeds, federal recovery investments, and private capital. There is federal legislation pending that would fund both national and state green banks or funds.
- **Capital support for state climate infrastructure projects could be identified through revenue bonding activities designed** to enable and encourage state and local revenue bonding to compete for any and all energy infrastructure investments that have a material impact on reducing carbon dioxide emissions.
- The Climate Action Plan proposes a **Power Sector Transformation** process to investigate structural approaches and make recommendations on the required transitions needed in our electricity delivery system as it electrifies, with focus on providing power sector that is ready for electrification and can deliver stable energy prices, and reduced energy infrastructure costs.

Options for consideration suggested by the Energy Working Group include, but are not limited to, public financing mechanisms for additional grid or generation capacity, consumer ownership and control of all, or the greater portion of, Maine’s power delivery systems to enable lower cost capital for infrastructure, as well as to refocus planning and investment priorities; and the viability of establishing a “Maine Power Authority” as a quasi-independent governmental entity to serve as the primary energy planning and financing authority in the state.

- Another option recommended is ongoing investigation of the potential utility and impact of multistate or national **carbon market programs**, beyond the electric power sector. Maine already prices power sector carbon emissions through its participation in the Regional Greenhouse Gas Initiative (RGGI) and returns the revenues back to participating states and consumers to invest in energy efficiency and for other state purposes. Economists generally believe that carbon pricing will be needed to address climate change; many also suggest that carbon prices need to increase over time and be accompanied by other complementary policies and measures, and many recommend that these policies would be best implemented at the federal level.
- Redeployment of some existing state resources, staff, and grant programs may also be helpful to accomplish some components of climate action. The state should review and revise **existing state grant programs** to align with climate mitigation and adaptation goals (e.g. clean water state revolving fund or municipal construction grant programs).
- At the time of this report’s publication, **Maine’s general fund budget** is strained due to significant revenue drops associated with the recession and pandemic, making new state general fund investments challenging. But Maine should consider future allocations of state funds to the targeted actions that require ongoing focus and support. Actions include those that require technical support, scientific monitoring, climate program leadership, and ongoing incentive programs. There are numerous worthy efforts named in this report – from monitoring marine species stocks and filling essential data needs to modernizing the efficiency of state buildings to technical support for farmers to supporting climate planning assistance to communities. All these initiatives require support that should be prioritized as the state budget outlook improves.

The success of Maine’s Climate Action plan will build off the rapid innovation and scientific advances in new energy and climate technologies. From rapidly accelerating vehicle batteries that will offer more cost-effective transportation solutions to advances in building material and heating technology, we know that some of the solutions that will advance our climate progress by 2030, and especially by 2050, will evolve in the coming years.

Maine should play a role in this progress, developing innovative companies that advance both climate solutions and economic prosperity. From the tremendous opportunities in the wood products sector, to agricultural and “blue carbon” sequestration, to floating offshore wind technologies, Maine can lead the country in many arenas of climate and energy innovation. These innovations will require ongoing state and federal investments, business program support, and a complimentary policy framework to encourage their growth.



## Measuring Progress

Evaluating progress toward Maine’s climate goals is a critical step for accountability and success. Clear metrics allow residents and decision-makers to understand whether policies are having the intended outcomes. This enables evidence-based adjustments, enhancements, or replacements to policies in pursuit of our 2030, 2045, and 2050 targets.

Two types of indicators will help Maine understand progress in addressing climate change:

The first type of indicators evaluates the *actions taken* toward achieving climate mitigation and adaptation goals. These indicators will assess significant program outcomes, such as the number of heat pumps installed or the number of green industry jobs created, and they are intended as a measure of effort and effectiveness.

The second type of indicators evaluates the *impacts achieved* collectively by a suite of programs and actions. The chief tracking vehicle is the Maine Department of Environmental Protection’s (DEP) Biennial Emissions Report: “Progress Toward Greenhouse Gas Reduction Goals” and uses verified state and EPA data sets to allow Maine to understand its emissions by sector and compare those emissions to other states. With the next required DEP report in January 2022, the state will also determine measures to track and report on state sequestration of carbon emissions, as well as the progress toward gross GHG emissions reduction goals. Other example includes changes in ocean acidification or reductions heat-related emergency room visits. Because of the global nature of climate change, some of these indicators are only available on a planetary scale, like atmospheric CO<sub>2</sub> concentration, and may respond slowly to the actions that Maine and other jurisdictions take collectively.

To be useful to residents and decision-makers, indicators should satisfy several criteria. They should be capable of being assessed accurately and regularly. The results should be available in a timely manner that enables responsive decision-making. Sampling and reporting should be designed so as not to unduly hinder the effectiveness of programmatic efforts and, in many cases can be built into program reporting.

The following *actions taken* indicators could be used to measure and communicate progress toward Maine’s climate goals:

- Clean Energy > % toward Maine Goal (RPS = 80% by 2050)
- Energy Efficiency > energy saved
- Green Jobs > # and % growth
- Clean cars > # and % increase in EVs
- Broadband > % high-speed access deployed
- Clean heating and cooling > # and % increase in heat pumps
- Protected land > # acres or % of land
- Resilient Communities > # towns completed plans and taking action
- Investment > Federal and private dollars leveraged per state dollar
- Equity Subcommittee *should recommend targeted goals for low-income, targeted communities for each indicator.*

In addition, Maine will continue to track emissions reductions by sector through DEP biennial reporting.

## Definitions

**Adaptation** - an adjustment by nature or a community that reduces the hazardous effects of climate change.

**Climate** - the average weather condition at a given place over a period. For example, meteorologists often make comparisons against a 30-year period, called a climate normal.

**Climate Change** - a difference in the climate over multiple decades or longer. Long-term changes/shifts in climate can result from both natural and human factors.

**Greenhouse Gases** - gases that absorb/act as a blanket, trapping heat in the atmosphere, including but not limited to water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

**(Climate) Mitigation** - a human intervention intended to reduce the rate of climate change by limiting the emission of greenhouse gases or by removing greenhouse gases from the atmosphere through natural or technological processes.

**(Hazard) Mitigation** - any sustained action taken intended to reduce or eliminate the long-term risk to human life and property from natural hazards.

**Resilience** - the ability of a community, business or the natural environment to prepare for, withstand, respond to and recover from a hazardous event.

**Sequestration or Carbon Sequestration** - the process of capturing carbon dioxide from the atmosphere or industrial processes and storing it for years to centuries; sometimes referred to as “negative emissions”. Carbon may be stored in biomass (such as trees, branches, wood products, foliage, and roots), soils, and rocks for varying periods of time, or reused in industrial applications; research and technological development into direct air capture of carbon dioxide for storage or reuse is ongoing but not yet developed at a large scale.

**Weather** - atmospheric conditions at any given time or place, measured from variables such as wind, temperature, humidity, air pressure, cloudiness, and precipitation. Weather can vary from hour-to-hour, day-to-day, and week-to-week.

## Scientific and Technical Reports

The work of the Maine Climate Council is informed by scientific and technical analyses including:

- A summary of the impacts of climate change in Maine by the Maine Climate Council Science and Technical Subcommittee ([Scientific Assessment of Climate Change and Its Effects in Maine](#))
- An analysis of the costs and benefits of the strategies recommended by the Working Groups (Assessing the Impacts Climate Change May Have on the State's Economy, Revenues, and Investment Decisions, an analysis by Eastern Research Group and Synapse Energy Economics). The report includes 4 volumes and a [Summary report](#)
  - [Volume 1, Vulnerability Mapping](#): A mapping analysis that identifies vulnerable communities, geographies, and economic sectors.
  - [Volume 2, Cost of Doing Nothing Analysis](#): Estimates of losses that the State of Maine and its citizens could incur if the State does not take action to prevent or prepare for climate change. The cost of not adapting to a changing climate is large and will accelerate over time, with flooding serving as the largest overall threat.
  - [Volume 3, Maine Emissions Analysis](#): An energy use and emissions baseline based on current state and regional policies, as well as an assessment of options for meeting Maine's energy needs (and allowing economic growth) while reducing greenhouse gas emissions.
  - [Volume 4, Economic Analyses of Adaptation and Mitigation Strategies](#): Economic analyses to provide context for the majority of the adaptation and mitigation strategies developed by the Maine Climate Council.
- An [Equity Assessment of Working Group Recommendations](#) conducted by the University of Maine's Senator George J. Mitchell Center for Sustainability solutions
- The report, [Strengthening Maine's Clean Energy Economy](#), currently under development by the Governor's Energy Office (GEO) and Governor's Office of Policy Innovation and the Future (GOPIF), will provide specific strategies to leverage Maine's renewable energy resources and energy efficiency services to recover and grow Maine's economy.

## Acknowledgements

- Climate Council Members
- Working Group Co-chairs and members
- Science and Technical Subcommittee co-chairs and members
- Equity Advisors
- Consultants, staff
- Public

The Maine Climate Council includes six working groups, each comprised of diverse stakeholders with expertise and experience in their topic areas. The six working groups of the Climate Council—(1) Transportation; (2) Buildings, Infrastructure and Housing; (3) Energy; (4) Community Resilience Planning, Emergency Management and Public Health; (5) Coastal and Marine; and (6) Natural and Working Lands— developed the draft strategies for the Climate Council to consider.

The details of the working group strategies are a resource for policymakers as Maine begins to implement the strategies in the Climate Action Plan. The working group reports are available at <https://www.maine.gov/future/initiatives/climate/climate-council/reports>.

- a. Transportation Working Group
- b. Buildings Infrastructure and Housing Working Group
- c. Energy Working Group
- d. Community Resilience, Public Health and Emergency Management Working Group
- e. Coastal and Marine Working Group
- f. Natural and Working Lands Working Group

### Public Input

Hearing directly from Maine people -- including stakeholders, experts, municipal leaders, legislators, youth, among other important groups was key to the process of creating this plan and it will continue to be important, including those who disagree with some of these proposed actions.

Public input has been sought throughout the climate planning process. The working groups each included 20-30 members with diverse perspectives and expertise, and the working group process to develop the draft recommendations was conducted via public meetings, calls, surveys, and individual and organizational input.

Over the summer, we received more than 4,400 responses through feedback survey on the website, [climatecouncil.maine.gov](https://climatecouncil.maine.gov). Members of the public were invited to learn about the impacts of climate change on the State, read the strategies recommended by the working groups, and provide feedback through a series of short surveys. Residents from almost three quarters of Maine communities submitted comments. Additionally, specific comment was submitted through the Council website, from numerous stakeholders, advocacy and industry groups.

Staff and working group leaders and members have also been conducting webinar presentations to groups of citizens, stakeholders, and communities. Due to the pandemic, much of this activity was conducted online, via zoom meetings, online surveys, and some limited, socially distanced outdoor meetings. We recognized that some communities may be harder to reach, especially those who lack access to the internet, and so as the work of implementation begins, staff will continue to work with key partners to reach groups that may be underrepresented in the climate process and/or experience disproportionate impacts, such as lower-income and rural residents, older adults, tribal communities, people of color, and New Mainers.