WHAT IS FOR/MAINE?

Forest Opportunity Roadmap / Maine (FOR/Maine) is a unique cross-sector collaboration between industry, communities, government, education, and non-profits, which have come together to ensure that Maine strategically adapts and capitalizes on changing markets, to maintain our leading role in the global forest economy and support prosperity in our state.

The coalition was created with support from the U.S. Economic Development Administration and U.S. Dept. of Agriculture. We are combining collaborative actions, innovation, market and resource management expertise, and reliable data to guide smart investment and market expansion in the forest economy. In 2018 FOR/Maine concluded its Phase I preliminary data-gathering efforts, and released its recommended goals and strategies in the Forest Opportunity Roadmap, available at www.formaine.org. Phase II of the project focuses on sustained collaboration for implementation of the Forest Opportunity Roadmap.

PHASE II: FROM FACT–FINDING TO IMPLEMENTATION

FOR/Maine is building on recent investment in the forest economy to promote continued growth through implementation of the Roadmap’s goals and strategies. Through rigorous research, we have identified the global wood products that can be competitively made in Maine; we’ve modeled and continue to update our sustainable wood supply projections; we are moving forward to commercialize new uses of wood and place Maine as a global center of wood technology innovation; we are developing a marketing plan to bring more capital investments to Maine; and building a communications strategy to promote career opportunities in a resurging forest industry.

Our success is defined by our collective ability to adapt to market opportunities and build resilient rural communities and a strong workforce, while constantly focusing on an economic development strategy that retains existing businesses, promotes innovation, encourages investment and builds market diversity. Together, we are realizing the next generation of Maine’s great forest economy.
Strong forest. Strong economy. Strong communities.

Maine is 89% covered by one of the most advanced, productive, and sustainable “resources” imaginable – the forest. More than half of Maine’s forests are certified sustainable, meaning they are managed for the health of the forest, wildlife, water quality, and economic contributions to the surrounding communities. They reduce carbon emissions as they grow, provide habitat for a huge variety of wildlife, invite recreation, and foster quality of life for residents and tourists year round.

For generations, Maine forests have provided economic opportunity for Maine families and communities. Forest outputs can be made into a staggering array of products, from packaging and advanced building materials, to eco-friendly chemicals and biodegradable plastics (replacing harmful petro-chemicals), textiles, and cutting edge medical and technical products made from nanocellulose.

Technology, globalization, and evolving social trends are bringing change and new opportunities to Maine’s traditional forest economy. The industry is adapting and diversifying in response, developing new economic revenue streams to produce sustainable, bio-based products for both domestic and global markets – all while conserving natural lands for recreation, tourism, and wildlife. Maine’s forest communities are creating the conditions to attract investment and high-quality jobs to rural areas, including efforts to redevelop mill sites and improve broadband access in rural areas.

STATISTICS: MAINE FOREST PRODUCTS COUNCIL, MAINE FOREST SERVICE, UNIVERSITY OF MAINE
Forest Products Stabilize and Support List for ERC

Introduction: Maine’s forest industry has experienced a rebound over the last few years with over $1 billion invested in existing mills/operations and new uses/operations. Unfortunately, we suffered a double whammy this winter with Covid19 and the explosion at the mill in Jay. The Jay mill was a substantial consumer of specific species of wood that now have very limited markets and are affecting landowners, loggers and sawmills alike. Even though demand at white pine sawmills is high, they must be able to get rid of their “residuals,” chips and sawdust, or they are forced to shove that valuable material in landfills. Our recovering building industry needs governments at all levels to continue issuing building permits and making necessary inspections in more populated regions of the east coast where Maine lumber is sold to keep orders flowing. Mills with strong safety commitments and records have had to invest in additional Covid19 measures in an ever-changing rules environment.

Stabilize and Support Necessities List

1. The Renewable Chemicals Act has already resulted in an innovative, emerging technology provider to contact players in our industry to see how they could fit in Maine. Opportunities we have been aggressively pursuing to solidify the base of the forest products pyramid of products are on hold because they can’t visit Maine and/or we can’t visit them.

2. State of Maine accepted/recommended Covid19 tests and recommended protocols must be made available to manufacturers so they can keep their employees healthy and avoid “hotspots”.

3. Maine should renew its Community-Based Renewable Energy Pilot Program so successfully used at Athens and Searsmont wood processing facilities. CHP (combined heat and power) holds great promise for co-locating Maine wood processing facilities with many other industries that need a source of heat and/or steam for heating and/or cooling. Coordinate this effort with USFS Community Wood Energy and Wood Innovation grants.

4. Maine’s newly staffed DECD has been proactive and surgical in their pursuits of “best fit” operations and technologies for Maine since the beginning of the Mills administration but Covid19 has understandably pushed them onto a different course to focus efforts on helping existing
Maine businesses navigate all the new realities created by economic and societal shut downs. We need to get their focus back on achieving the goals and objective of the strategic economic plan.

5. State of Maine purchasing power: State government can lead the way in “buy local” practices by specifying carbon sequestering building materials like wood in Cross Laminated Timber systems. It can ensure Maine made toilet paper is used at all facilities. It can burn biofuels rather than oil/gas at state facilities. The list can go on and on.

6. We have been proactively working with the Maine DOT on priority road and bridge projects, along with potential rail improvements, required to keep our products flowing to markets. Those could move up the State’s priority lists.

7. The MTI, MTAF competitive grant program has resulted in new technology development using wood as feedstock for environmentally superior insulation. A new round of Northern Border Regional Commission dollars is funding programs in Ashland, Madison, Lincoln, and the Millinocket area with focus on new, diverse uses of wood as a feedstock. Maine should fund another round of MTAF.

8. Make active use of the Economic Damage Relief Package using USDA bridge loans for loggers and truckers whose business interruption has not been covered by PPP.
Maine Strategic Growth Plan References to Forest Industry Potential
(for use in MFG & Natural Resources sub-committee of ERC)

With innovations that are already underway, we can diversify our heritage industries. We can grow protein in new ways to diversify fishing and farming. We can use wood and wood residuals for new fuels, plastics, and building materials.

Maine is well-poised, both through its natural resources and its people, to embrace innovation that can not only contribute to global climate solutions, but drive productivity across the entire economy.

Supporting the continued growth of bio-based alternative products that emerge from the intersection of wood supply, bioplastic, and advanced building material technologies.

Maine has all of the needed natural ingredients to grow and prosper over the next ten years and beyond. In a world that is seeking renewable resources to replace petroleum-based products, Maine has an abundance of forests, and the technology to convert them into environmentally responsible alternatives.

By 2030, Maine will be an international leader with a vibrant, sustainable, environmentally-responsible economy. All across the state, the people of Maine will have access to an unmatched quality of life and good-paying jobs.

CRAWLEY AND HALLOWELL WRITE:
For example, in the last couple of years the forest product industry has seen quantum leaps forward in development where new products have begun to emerge such as nanocellulose. This product takes advantage of the great abundance of trees with cutting edge science and engineering. To keep pushing this evolution, support is needed in the existing value chain, i.e. loggers are still required to fell trees and transport is still required to mills, in addition to new elements such as coders, chemists and biologists. This thematic approach requires cross cutting labor force policies that generate the depth of skills and training needed from basic to advanced degrees.

They (Crawley and Hallowell) identified four “thematic areas” in which Maine has current strengths, there is growing global demand, and there is a potential for job
creation — particularly at the intersections of these strengths. The four themes are: Food/Marine, Forest Products, Technical Services, and Making/Manufacturing.

Bio-based alternatives
Forest products is an example of Maine’s key position in developing solutions to meet global demand. Innovative building materials that sequester carbon and make buildings more energy efficient leverage Maine’s forest resources and forest-based economy to respond to consumer demand for more sustainable products.

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Advanced Building Materials, Bioplastics, Biofuels

Maine is well positioned to develop solutions for the global climate challenge. We have established ambitious goals to reduce our carbon emissions, including requirements for increased renewable energy generation. A changing climate, and the need for new, more efficient technologies offers tremendous opportunities for Maine’s wood products sector. From cross laminated timber, a substitute for carbon-intensive steel, to bio-fuels to wood-based insulation products, Maine is poised to be a leader in innovative construction products.

Mature businesses can use these thematic opportunities to help diversify and stabilize supply chains throughout the state, and new enterprises can use them to find high growth opportunities.

Maine has some distinctive strengths that support the four themes for high-wage growth described earlier. The University of Maine, with world-class wood composites, climate change, food, and aquaculture research programs, is based in the Greater Bangor region, but is a statewide asset.

This plan has a focus in four thematic areas; Food/Marine, Forest Products, Making/Manufacturing, and Technical Services. The intersection of these areas with significant global trends is where the largest opportunities exist for growth through innovation.

Maine’s Beverage Manufacturing industry could enter a new era of sustainable production using plant-based packaging materials.

As an example, advancements in the forest products industry will improve the value of a tree being removed from the woods in Western Maine, even though the production may be done in Lincoln. Focusing on supply chain development throughout the state ensures that the value of the hub is realized in many areas of the state.
Governor’s Economic Recovery Committee

Manufacturing & Natural Resource-Based Industries Subcommittee

Report from the Forestry Sector – Stephen Schley
Maine forest essentials

- Most forested state in the U.S. (89%).
- As much forestland now as when Europeans arrived in the 1600s.
- 91% of Maine’s forest is privately owned. It is the largest contiguous block of private commercial forestland in the U.S.
- Early adopter of forest certification and now the national leader in certified acres (8.3 million)
- Most dependent state on forest sector (4-6% of GDP)
- Leader in conservation easements (4 million+ acres)
Productivity has increased for loggers

Pre-1960s
- Length of season: 30 weeks
- 1950 loggers: 4,677
- About 270 cords per logger per year
- 1950 harvest: 2.9 million million cords

1960–1980
- Length of season: 40 weeks
- 1970 loggers: 4,500
- About 1,333 cords per logger per year
- 1970 harvest: 5 million cords

1980–present
- Length of season: 47 weeks
- Loggers in 2018: 1,988*
- 2,523 cords per logger per year
- 2018 harvest: 5,042 million cords
And sawmills . . .

1950
- Mills: 232
- Workers: 3,326
- Production (MBF): 497,486
- MBF per worker per year: **126**

1981
- Mills: 368
- Workers: 3,326
- Production (MBF): 742,652
- MBF per worker per year: **223**

2018
- Mills reporting: 70
- Workers: 2,045
- Production (MBF*): 933,240
- MBF per worker per year: **456**
And pulp and paper mills

1960-1961
- Mills: 27
- Workers: 17,109
- Tons per year: 1.7 million
- Tons per worker per year: 99

1981-1983
- Mills: 21
- Workers: 18,076
- Tons per year: 3.2 million
- Tons per worker per year: 177

2018
- Mills: 6
- Workers: 3,096
- Tons per year: 2.5 million
- Tons per worker per year: 826
**ME Historic & Potential Sustainable Harvest**

(Sources: MFS Wood Processor Report; FOR/Me Wood Supply Report)

**DRAFT**

Annual Harvest of Commercially Important Species in Maine (sawlogs, pulpwood & firewood)
Wood Used for Energy in Maine (green tons), 2010 – 2016 (FOR/Maine Wood Energy Report)
Wood Used for Energy In Maine 2010-2016
Green Tons Reported In-Woods Biomass (MFS) and Mill Residuals (DEP)
Wood is the most environmentally sound material on earth. It’s renewable, highly versatile, grown with relatively little effort, carbon friendly, and most important, it is produced and stored in the form of forests that provide a wide array of valuable ecosystem services, including . . .
Clean air
Clean water
Biodiversity
Wildlife habitat
Recreation
Aesthetic places
Today, trees are replacing plastic, supplanting fossil fuels, advancing medical technology, improving clothing’s comfort, even making toothpaste work better.

New technology, Yankee innovation and continued sustainable management practices are driving the Maine forest industry’s rise to meet global demands.

Maine’s forests are full of opportunities
The future demand for wood is projected to increase.

Global market analysis weighted scores

<table>
<thead>
<tr>
<th>Material</th>
<th>Competition</th>
<th>Opportunities</th>
<th>Market</th>
<th>Barriers to Entry</th>
<th>Constraints</th>
<th>Life Cycle</th>
<th>Log Intake</th>
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Wood buildings sequester carbon
Start from wood, and MAKE IT ALL.
The market for biobased materials and chemicals has reached $1B (a 28% annual increase).

2/3 of total chemicals worldwide can be produced from biobased material - over 50,000 products, a $1T annual global market.

Global demand for biobased and biodegradable plastics will rise 19% per year. Rising demand for bioplastics for food + beverages.
Potential Biobased Opportunities

• Nanocelluose
  (papermaking, cosmetics, foam insulation, thickening foods)

• Bioplastics
  (food containers, packaging, 3D printing)

• Advanced biofuels
  (for planes and ships)

This Shelby Cobra was 3D printed at the Department of Energy’s Manufacturing Demonstration Facility at the Oak Ridge National Laboratory.
Nanocellulose Projects at UMaine

➢ The Process Development Center is the only facility in the U.S. that can manufacture cellulose nanofibers (CNF) at a rate of one ton per day

➢ Nanocellulose is a naturally occurring material composed of nanofibrils that have been isolated from a cellulosic material. Saves space, time, material, and energy

➢ The PDC primarily works with nanocellulose that is derived from trees and wood pulp.

➢ Nanocellulose can be used to make bioplastic-like materials, and is being tested for biomedical applications, such as for bone replacements.
Wood based fibers - the natural choice
-biodegradable
-compostable
-recyclable
-renewable
**Cellulosic fibre properties helping drive growth**

### Fibre properties and applications

<table>
<thead>
<tr>
<th>Applications</th>
<th>Cellulosic fibres</th>
<th>Cotton</th>
<th>Polyester</th>
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<td>Durability</td>
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<td>Renewable and biodegradeable</td>
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<td>Resource efficiency</td>
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### Function and feel

- **Source:** IHS Global, RISI, Hawkins Wright.

### Overall value proposition

- **Natural and attractive, ‘greener’ alternative to cotton**
- **Natural, functional and well established**
- **Cheap, durable and versatile**

### Key strengths

- Nonwovens/Technical textiles
- Home textiles
- Apparel

- On a pure property basis, cellulosic fibres are superior to cotton and differentiated on sustainability.
- Polyester is differentiated on strength / durability versus cotton and cellulosic fibres.
Your road to success in Maine!

Just some of the reasons to build an MDF or particle board mill in Maine:

- A world class labor force.
- 18 million acres of privately owned forestland with landowners who want to cut wood – no federal red tape!
- For the next 20 years, Maine’s forests will sustainably produce three million tons per year of currently unutilized spruce and fir fiber.
- The University of Maine has one of the top research laboratories in the world for forest products, including nanocellulose.
- The average wildfire in Maine is less than one acre. Wildfires are attacked quickly and kept small. In 2019, Maine was 45th of 50 states with only 142 acres burned.
- “The Way Life Should Be” – Maine is an absolutely beautiful place to live and a great place to run a business.

Contact Charlotte Mace
Maine Department of Economic and Community Development
charlotte.mace@maine.gov • 207-624-7448
US Actual and Predicted Housing Starts

The Financial Forecast Center™
Maine’s Carbon Policy: What’s the Role of the Forest?
Future is positive but planning and action are required.

*In the two years prior to COVID-19 over $1 Billion in Capital Investments had been made in Maine’s Forest Economy, fueling a strong period of growth.*
Short term response actions focused on protecting the businesses that we have (retention)

• Examine overall sector and all components of the supply chain. (Designation of Essential Services was critical)
  • Landowners
  • Loggers & Truckers
  • Manufacturers

• Market resetting factors;
  • Pulp & Paper (consumer demand for paper packaging, container stock, tissue)
  • Solid Wood and Panels (consumer demand – housing starts)
Short term response actions focused on protecting the businesses that we have - Retention

• COVID Testing plan and resources for manufacturing & logging
• PPP program continuance and revisions (Congress)
• Economic Damage Relief Package USDA Loans/Grants
  • Logging & Trucking business interruption loans
  • Manufacturing COVID PPE Expense relief
• Focus on assistance to Pixelle rebuilding pulp capacity
• Work with regional governors to ensure building permit processing (FIAC national concern)
• Address challenges of extended benefits for unemployment claims hindering back-to-work needs.
Business Stabilization and Expansion

• Renewable Chemicals Act Implementation
• Exercise State of Maine purchasing muscle in forest products:
  • Cross Laminated Timber construction of State Building
  • Off-take agreements for forest biofuel products
  • Wood thermal heating in public buildings (chips, pellets, biofuel)
• Continue collaborative DOT planning efforts with forest industry and support federal stimulus funding
• Support MTI, MTAF competitive grant programs
• Assist in residual wood market development:
  • Long-term PSA efficient and smart sized CHP power plants
  • Establish CHP co-location opportunities matching energy and thermal needs between energy producers (e.g. sawmills) and energy users (e.g. industry and institutions)
  • Thermal Credit market development
• Assist northern Maine businesses establish a comprehensive energy plan for the region to stabilize costs and guide energy development.
• Capitalize on potential rural migration of workers with broadband development
Business Attraction

• Focus on global climate opportunities for Maine to build circular bioeconomy similar to efforts in Finland.

• Support collaborative effort of FOR/ME Market Attraction Plan with DECD, Industry, MITC, UMO.

• Strong marketing for MDF panel facility location in Maine using low grade wood.

• State Workforce Development efforts to be supplemented by FOR/ME industry survey.