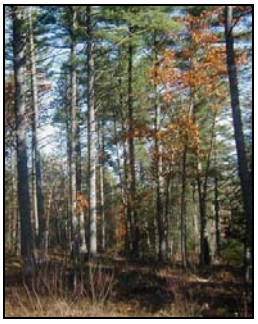
MAINE FUTURE FOREST ECONOMY PROJECT



CURRENT CONDITIONS AND FACTORS INFLUENCING THE FUTURE OF MAINE'S FOREST PRODUCTS INDUSTRY

MARCH 2005

PREPARED FOR:

DEPARTMENT OF CONSERVATION – MAINE FOREST SERVICE
AND
MAINE TECHNOLOGY INSTITUTE

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Executive Summary
Maine Future Forest Economy Project

The Maine Future Forest Economy Project represents a significant and unique commitment of resources by the Department of Conservation – Maine Forest Service and the Maine Technology Institute to understand and support an economically and environmentally robust future for Maine's forest products manufacturing sector. This project has been informed by the participation of 300 individuals and firms, an advisory group that contributed throughout the project, and forest industry experts from the private sector, government and academia.[1]

Project Summary

Maine's forest products manufacturing industry is critical to Maine's economic and environmental health. The industry provides not only manufacturing jobs and economic impact throughout the state, but is critical to the maintenance of undeveloped forestland and the many benefits it provides, helps support a traditional way of life in many Maine communities, and serves as an anchor for the state's resource-based economy. Maintenance of a robust and diverse forest products industry has important environmental and social benefits, as well economic importance to Maine.

The *Maine Future Forest Economy Project* is an initiative of the Department of Conservation – Maine Forest Service, with additional funding from the Maine Technology Institute, to:

> "[Identify] what is needed to maintain Maine's existing wood using industries, to identify growth opportunities in existing and potential new wood using industries, and to identify what Maine State Government and the industry itself could do to improve the prospects for Maine's forest products industries."[2]

This project is part of Maine state government's ongoing effort to better understand and support the state's forest products industry. The focus of the Maine Future Forest Economy Project is on the manufacturing firms that are part of the forest products industry in Maine.

Innovative Natural Resource Solutions LLC (INRS) undertook this effort with assistance from a number of other industry experts and a twelve member Advisory Committee appointed by the Department of Conservation – Maine Forest Service. The Department of Conservation - Maine Forest Service, the Advisory Committee and experts that INRS engaged provided important research and insight that adds to this work; however, all

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[1] This executive summary serves as a highly condensed highlight of the *Maine Future Forest Economy Project*, conducted in 2004. This summary is based upon significant sector-by-sector and issue-by-issue analysis in the full report, and should be viewed as an overview of the project only. A listing of all chapters in the report is contained in Appendix A.

[2] Maine Department of Conservation. *Request for Proposals: Maine Future Forest Economy Project.* October 3, 2003.

findings and recommendations contained in this report are the responsibility of INRS unless otherwise noted.

Conclusions

Maine has the largest and most diverse forest products industry in New England. The state's forest products manufacturing industry is facing increasing challenges from across the globe, but is taking tangible steps to address these challenges. There is clear public support for both the forest products industry and possible action steps to support the industry; this opportunity must be seized. If Maine is to maintain the forest products industry as the strong and diverse cluster we see today, Maine needs to encourage new investments in the latest technologies and encourage innovation. To accomplish this objective, Maine should address challenges to its business climate and encourage diversification of forest products, particularly in those areas such as engineered wood products or bio-products where intellectual property protections may provide a significant competitive advantage.

Recommendations for Action

Maine's forest products industry is facing unprecedented challenges in today's global economy. Many sectors of the Maine forest industry are producing as much or more product than recent historic averages, and the output of some sectors of the industry have grown significantly in the last few decades. As an *industry*, forest products manufacturers have continued to invest, innovate, and produce. The opportunity to build upon the existing strength of Maine's forest industry should not be lost.

The forest products industry, and individual sectors of the industry, face very real challenges today. These challenges did not appear overnight, and they will not be eliminated overnight. Only through a sustained and concentrated effort and building upon its existing strength can we expect a vibrant and dynamic forest products economy twenty years from today.

The following recommendations are designed to provide a roadmap for both state government and the forest industry going forward. By addressing these challenges and seizing these opportunities, each of which is based upon findings in this report, Maine will position itself as a place that welcomes forest industry, encourages innovation, and works collaboratively to address challenges as they arise.

Encourage Capital Investment

1. Improve Maine's investment climate through prospective elimination of the personal property tax on business equipment.
    - Leave Business Equipment Tax Refund (BETR) program in place for existing capital investments

Work Collaboratively to Create Predictability and Policy Stability

2. Improve the relationship between Maine's forest products industry and state government and other stakeholders, and work toward a common goal of a vibrant, sustainable forest industry in Maine.
3. Provide for a high-level state staff member who has credibility and relationships with all state agencies and is responsible for coordination of efforts to address issues within the forest products manufacturing industry. This position will:
    - Focus on areas where existing responsibilities of Department of Conservation and Department of Economic & Community Development overlap;
    - Develop a point of contact and industry expert within state government, and provide coordinated outreach to forest products manufacturers.
    - Stay abreast of current global, regional and local market conditions, and work with industry and appropriate state agencies to forecast factors in a timely manner that are known to influence the forest products industry.
4. Conduct a collaborative effort spearheaded by the forest products industry, state government and the University of Maine to help Maine citizens, legislators, opinion leaders and others understand the current state of the forest products industry, the challenges it faces, and the actions that might best improve the long-term prospects of the industry.
    - Initiate a program to provide positive and fact-based outreach on the state of the forest products industry;
    - Differentiate between the state of an entire industry and the economic health of single manufacturing facilities.
5. Create both the perception and reality of public policy consistency and predictability.
    - Work collaboratively to identify long-term roadmaps for issues of concern;
    - Encourage voluntary and non-regulatory action to address public policy issues where possible and appropriate.

Invest in Technology

6. Increase efforts to move work conducted at Maine's world-class research and development facilities to commercial application in Maine.
    - Provide economic incentives for individuals outside the University system to market new technologies to the private sector;
7. Promote research, development and commercialization of bio-based products, particularly those that are compatible with Maine's existing forest products manufacturing infrastructure.
    - Focus state financial support on areas most compatible with the existing forest products manufacturing infrastructure;

8. Expose Maine forest product manufacturers to the latest technologies
    - Encourage vendors to meet with larger groups of forest product manufacturers (see recommendation #11);
    - Provide information on new technology developments to Maine mills
9. If Maine pursues an aggressive renewable portfolio standard (RPS) to encourage development of renewable energy, biomass power that meets certain emissions standards should be included.
    - If an RPS is established that is designed to provide meaningful incentives for renewable energy, models exist in New England (Connecticut and Massachusetts have robust Renewable Portfolio Standards) that encourage improved environmental performance at existing and new biomass energy facilities.

Develop Entrepreneurial Talent in the Industry

10. Form a public – private partnership to encourage shared training, creative thinking, business development and improved operations management for sawmills and wood product manufacturers.
    - Develop a continuing education program that focuses on the business and mill management aspects of the solid wood industry.
11. Forest product manufacturers or industry sectors should work together to develop entrepreneurial networks, share information, and learn about emerging opportunities.
    - Highlight areas of non-policy common interest, encouraging entrepreneurial thinking and cluster networking;
    - Provide an opportunity to highlight successes and learning opportunities at a wide range of forest product manufacturers.
12. Develop a one-day annual meeting and trade show for micro-businesses engaged in forest product manufacturing.
    - Provide "one-stop" learning for individuals engaged in micro-businesses to learn about opportunities and share experiences, thus encouraging development of a stronger micro-business network in Maine.

Distinguish Maine Products in the Marketplace

13. Develop a marketing campaign that highlights the environmental and other benefits of Maine forest products, and use this to help distinguish Maine products in a global marketplace.
    - Build upon strength of existing *Maine Made* program for consumer products;
    - Explore working with neighboring states to create a regional brand, which has proven successful for other forest products.
    - Capitalize on Maine's unique position among U.S. paper manufacturers as having a strong spruce – fir resource.

Improve the Ability of Maine Forest Product Manufacturers to Compete

14. Improve the connections of existing state business assistance and business development programs to forest product manufacturers, and have the forest industry evaluate existing programs and offer suggestions on how existing programs might better meet the needs of forest product manufacturers.
    - Host "opportunity fairs" statewide that bring forest product manufacturers in contact with the large number of programs available to them;
    - Review existing programs for ability to meet the needs of forest products manufacturers.
15. Create a "Maine Manufacturing Competitiveness Fund", a revolving fund that provides manufacturers with capital to make capital investments in energy efficiency.
    - Provide very low-interest loans to encourage energy efficiency investments;
    - Tie payments to energy savings, allowing recipients to see no increase in overall costs.
16. Adopt a "Manufacturing Energy Policy"
    - Recognize the importance of energy costs to Maine manufacturers;
    - Encourage all regulatory decisions regarding energy to expressly consider the impact on Maine's manufacturing economy.
17. Continue to support the Maine Congressional Delegation's effort to obtain a Congressional federal weight limit exemption for Maine's currently non-exempt Interstate highways.
    - Work to get the weight limit on all of Maine's Interstate Highway System increased to 100,000 pounds.
18. Work with the Maine Department of Transportation to implement recommendations in their Integrated Freight Plan.
    - Implement the recommendations on this comprehensive plan to encourage the safe and efficient transportation of freight, improve Maine's rail and port systems, and address inter-modal connection.
19. Continue state efforts to address challenges in Maine's business climate.
    - Examples are state efforts to address speed of environmental permitting and health care costs.

In addition to these core recommendations, the full report contains a number of additional recommendations from others who provided input to the project, including a number of industry experts and over fifty Maine forest industries that took the time to complete one of two surveys.

Findings

Introduction

Throughout its history, Maine has enjoyed a strong and diverse forest industry, and has served as the anchor for the forest products industry throughout the Northeast. The industry has grown and changed over time, but a strong forest product manufacturing base has been a constant in Maine's economy. The forest products industry is recognized as a diverse and interdependent industry, and, as a mature industry, has historically provided a level of stability to Maine's economy.

Today, Maine forest industries face unprecedented challenges. The rapid growth of a global marketplace has provided increased trade opportunities for Maine forest products, while at the same time allowing new competitors into markets that Maine companies have long enjoyed.

Maine's forest economy is in the midst of significant changes, and some of these changes are painful to both the state and the industry. While Maine's forest industry does clearly face a series of challenges – and is in the midst of what will be continued and rapid evolution, the industry remains a pillar of Maine's rural economy, and is taking steps to retain or improve its competitive position. For example, paper and lumber production remain at or near record levels when measured by volume, though employment in both of these sectors has decreased.

Maine's Forest Industry Cluster

Maine has a strong forest products cluster, with very strong relationships among segments of the diverse industry. "Clusters" are a location-based group of interconnected and interdependent industries that compete with one another *and* strengthen one another through interaction. Cluster members include not only the key manufacturers, but also the suppliers, academic and government institutions that support the industry, trade associations and firms that provide services to the industry. The existence of a robust and functioning cluster is critical to maintaining the competitive strength of Maine's forest products industry.

In Maine, the forest products cluster includes pulp and paper companies, sawmills, secondary wood product manufacturers, biomass energy firms, forest landowners and managers, loggers, equipment manufacturers and distributors, biomass power facilities, university programs, financial institutions, government agencies, trade associations, forest-based recreation businesses and transportation firms.

The diversity and depth of Maine's forest products cluster is its strength, and this state anchors the Northeast's forest products economy. The existing forest products industry provides markets for all types of wood, from veneers and sawlogs to pulpwood and biomass. This diversity allows landowners and loggers markets for all of the products they grow and harvest, and allows land managers to practice sustainable forestry.

Markets for low-grade wood, such as pulp mills and biomass electricity facilities, are particularly important in this regard. Additionally, what is waste material for one manufacturing process often serves as raw material for another sector of the forest product manufacturing industry.

Status of Maine's Forest Industry

Among the findings of the *Maine Future Forest Economy Project* are:

- In general, while levels of output are up significantly in some sectors of Maine's forest products industry over the last few decades, Maine forest product manufacturers are facing challenges in an increasingly competitive global marketplace. This global marketplace presents both opportunities and challenges. Some firms have prospered in the face of this competition; others have not. The future is likely to see some firms shrinking or leaving Maine, while others increase their presence or output.

- Output at paper mills and sawmills is near record levels when measured by volume, though employment is down. In order to remain competitive in the future, it is likely that existing manufacturers will need to increase productivity, which will likely lead to fewer, more highly-skilled employees in the forest products industry.

- By volume, Maine is the second-largest paper-producing state in the nation. The competitive position of paper mills varies significantly by mill and by grade. Like the entire paper industry, Maine mills have suffered during the recent economic downturn. The many mills that produce printing grades have experienced a shrinking overall market, though this may change as the economy rebounds as use of these paper grades is closely tied with the overall health of the economy. Maine paper mills have seen relatively stable output over the last decade, while employment has decreased significantly. Maine mills that use spruce-fir fiber in their production are uniquely positioned in the U.S., and many may be able to take advantage of certain market opportunities when exchange rates favor U.S. production.

- Maine sawmills are producing near-record volumes of lumber. Since 1975, Maine softwood production (the bulk of the state's sawmill production) has increased 250%; hardwood production has increased roughly 400%. Maine lumber manufacturers have enjoyed a strong housing market over the last several years; likely increases in interest rates may put the brakes on this growth. On the hardwood side, significant losses of furniture manufacturers and pallet customers in the U.S. have led to a nationwide decline in the market for hardwoods. Investments that increase productivity are critical to the continued competitiveness of this sector.

- Maine has a diverse secondary wood products sector, which produces everything from furniture and pallets to golf tees and boats. This sector has suffered some very high-profile losses in recent years, including the closing of several labor-intensive turned product manufacturers. At the same time, some larger wood product manufacturers have increased their production or solidified market share, and some small micro-businesses have found profitable niches.

- Engineered wood composites refer to products in which wood fiber is reconstituted with resins or other adhesives to produce a new product. Maine has a small number of engineered wood facilities; including some of the earliest oriented strand board (OSB) facilities in the nation. In part because they are older, these Maine OSB facilities are now high-cost producers, and will face significant pressure and may curtail operations or close if --as predicted -- capacity utilization industry-wide shrinks. For newer, emerging engineered products, the *AEWC Center* at the University of Maine is a world-class research institute that is developing new applications and uses for wood. Some of the advancements from this facility are quite promising, and at least one thriving Maine business has already come from research conducted at the AEWC Center.

- Maine has ten facilities where biomass energy is the primary or sole product, and a large number of forest product manufacturing firms that burn wood to generate heat, steam, and electricity for internal use or sale. These facilities are important to supporting the entire cluster and allowing good forest management as they provide a market for waste products from manufacturing (thus avoiding disposal costs) and provide a market for trees of low economic value. For facilities that produce electricity for sale, public policy in other nearby states has recently created incentives for facilities that want to sell into these markets to invest in new combustion or emission control equipment and sell "green" energy credits, in addition to selling electricity. At the same time, overall electricity prices have risen recently, and many biomass electricity facilities are currently operating at or near full capacity; it is difficult to predict how long this will last, and is largely tied to the price of fossil fuel competitors.

- Bio-based products are those that are derived through the chemical re-composition of woody biomass or byproduct into a new value added material. This manufactured material may be a fuel, chemical, food additive, pharmaceutical, or other substance. Bio-products can be made at stand-alone facilities, or may be integrated with existing manufacturing sites such as pulp and paper mills. Such products also have the benefit of reducing our dependence on foreign oil. There are significant opportunities to develop a bio-product sector in Maine, but a number of barriers – technical and economic – must be addressed before bio-product production becomes an economic reality.

Summary of Opportunities and Challenges Facing Maine Forest Product Manufacturers

The following table provides a summary of the opportunities, challenges and product-specific action items for many of the forest products manufactured in Maine. Due to the summary nature of this matrix, not every forest product manufactured in Maine is covered in this analysis. Further, individual companies may have business plans or strategies that position them differently than others in the category. Product-specific action steps in the matrix below denote those recommended actions that would be of greatest specific benefit to the product discussed, but *do not* necessarily indicate that other broader action steps are of less importance to the health and viability of this product group. Issues common to most or all forest products include fiber availability (both sustainable forest management and sufficient logging capacity), a consistent and predictable regulatory climate, the cost of labor and health insurance, and issues related to Maine's business climate. Strengths or opportunities common to all include a diverse forest provide a wide range of products, a skilled workforce, a large and growing amount of certified acreage to draw supply from, and a strong cluster that allows for interaction and idea sharing.

Product	Opportunities	Challenges	Product-Specific Action Priorities
• **Coated Groundwood** ➢ Used in high-end magazines, catalogues, and newspaper inserts ➢ Produced at Madawaska, Jay, Bucksport and Rumford	• Cost of production as a group lower than other North American regions • Modest demand growth expected from both catalogues and magazines • Growth opportunities for lightweight grades due to postal increases	• New, low-cost production coming on-line globally equal to 75% of Maine's capacity • Some Maine mills and machines noticeably higher cost • Relatively high payroll expenses ($/ton) likely result of older machines	• Investment in productivity improvements • Change Maine tax structure to encourage large capital investment
• **Uncoated Groundwood** ➢ Directory and supercalendared grades ➢ Produced at Madawaska, East Millinocket, Millinocket and Madison	• As a group, Maine machines generally well-positioned globally in supercalendared grade, though higher cost of production than U.S. average • Near-term demand growth expected, in part due to rise of independent telephone directories • Potential for a high-bright grade product to compete with uncoated freesheet	• For directory grade, cost of production as a group higher than other regions in North America and globally • Relatively flat cost curve allows for small changes in cost of production to dramatically change a mills competitive position	• Investment in productivity improvements • Change Maine tax structure to encourage large capital investment

Product	Opportunities	Challenges	Product-Specific Action Priorities
Paper • **Coated Freesheet** ➢ Uses include high-end magazines, catalogues, brochures, and direct mail ➢ Produced at Jay, Rumford, and Skowhegan	• Cost of production as a group lower than other North American regions • Several comparatively low-cost machines at Maine mills • Demand growth expected, at roughly rate of Gross Domestic Product (GDP) growth • Increased market share through use of certified wood	• New, low-cost production coming on-line globally more than double Maine's capacity • Two machines at Maine mills noticeably higher cost	• Investment in productivity improvements • Change Maine tax structure to encourage large capital investment
• **Uncoated Freesheet** ➢ Uses include business applications, copy paper, commercial printing and envelopes ➢ Produced at Jay, Madawaska, Woodland	• Very modest demand growth expected, though lower than growth in GDP	• Cost of production as a group higher than other North American regions except Wisconsin • Relatively high payroll expenses ($/ton) likely result of older machines • No Maine machines in lower half of North American cost curve • Energy costs competitive disadvantage for Maine mills • New, low-cost production coming on-line globally roughly triple Maine's capacity • New European hi-bright groundwood grade taking market share	• Investment in productivity improvements • Change Maine tax structure to encourage large capital investment • Take steps to lower energy costs, including energy efficiency improvements

Product	Opportunities	Challenges	Product-Specific Action Priorities
Solid Wood • **Hardwood Lumber** ➢ Uses include pallets, furniture, flooring and millwork ➢ Produced at over 100 sawmills statewide	• Maine has well-established hardwood lumber sector, with existing customer base and relationships • Sector has been making investments in production and productivity • Northern hardwood species are known and valued in a wide variety of markets	• North American use of hardwood for pallets and furniture declining • Significant resource competition from Canadian manufacturers	• Develop marketing campaign that distinguishes Maine forest products • Investment in productivity improvements • Change Maine tax structure to encourage capital investment • Distinguish Maine production through use of certified wood
• **Softwood Lumber (structural)** ➢ Used in construction, primarily "2x" lumber ➢ Produced at 5 major sawmills statewide, and a number of smaller mills	• Demand from home construction and renovation has been strong • Sector has been making investments in production and productivity • Proximity to large market provides some advantages	• Uncertainty regarding U.S. / Canadian softwood lumber tariffs cloud future for Maine producers • Anticipated change in interest rates could slow housing starts and reduce overall demand • Significant new offshore competitors emerging • Difficult to differentiate structural lumber in the marketplace • Significant resource competition from Canadian manufacturers	• Investment in productivity improvements • Change Maine tax structure to encourage capital investment • Increase federal weight restrictions on Maine's interstate system • Develop marketing campaign that distinguishes Maine forest products • Distinguish Maine production through use of certified wood.
• **White Pine** ➢ Uses include millwork, windows and doors, furniture and flooring ➢ Produced at roughly 100 sawmills statewide	• Market demand strong and anticipated to grow • New England region preferred by lumber purchasers • Sector has been making investments in capacity and productivity	• Anticipated capacity growth larger in regions outside New England (percentage basis) • Competition from offshore species growing • Significant resource competition from Canadian manufacturers	• Develop marketing campaign that distinguishes Maine forest products • Investment in productivity improvements • Change Maine tax structure to encourage capital investment • Distinguish Maine production through use of certified wood.

Product	Opportunities	Challenges	Product-Specific Action Priorities
Solid Wood • **Furniture** ➢ Roughly ten major facilities, and many smaller firms	• Remaining facilities have history and knowledge of furniture manufacturing and markets • Maine proximate to and known to large furniture consumers • Opportunity to move to "mass customization" or other business models that de-emphasize price	• Furniture imports more than tripled over past decade, and move to offshore manufacturing expected to continue • Opportunity to compete largely on price lost • Labor costs	• Develop marketing campaign that distinguishes Maine forest products • Develop public-private partnership to encourage shared training and improved operations management
• **Turned Products** ➢ Products include dowels, golf tees, and furniture parts ➢ Produced at five major facilities in Maine, several smaller facilities	• Some remaining companies well positioned in their niches, often control intellectual property • Opportunities to serve niche markets or develop business strategies that do not rely upon being least-cost producer	• Competition from offshore manufacturers increasing dramatically • A number of large turning business have closed in recent years • Labor costs	• Develop marketing campaign that distinguishes Maine forest products • Investment in productivity improvements • Change Maine tax structure to encourage capital investment
• **Micro-Businesses**	• Enormous diversity of this sector is great strength • Size of businesses requires that they be niche-nimble and responsive to customer demand • Strong "image" connection to customers	• Many have only one employee who must handle all aspects of business, from manufacturing to accounting and marketing • Small size of firms makes it difficult to find, organize and address group needs	• Develop marketing campaign that distinguishes Maine forest products • Develop annual meeting and trade show for micro-businesses • Improve efforts to connect Maine forest industries and existing business development programs

Product	Opportunities	Challenges	Product-Specific Action Priorities
Engineered Wood Products • **Oriented Strand Board** ➢ A structural panel whose applications include exterior walls and flooring ➢ Produced in Limerick, Easton, Woodland (idle)	• North American demand expected to grow • Individual companies have made strategic investments in developing niche markets and in productivity	• Maine facilities are older, smaller, less efficient and some of the highest-cost in North America • Trucking expenses associated with facilities comparatively high due to location and weight restrictions • Greatest market demand in distant regions of the U.S.	• Increase federal weight restrictions on Maine's interstate system north of Augusta • Investment in productivity improvements • Change Maine tax structure to encourage large capital investment
• **Emerging Engineered and Composite Wood Products**	• AEWC Center at University of Maine a world-class research institution in development of new wood composite products	• New products must penetrate existing markets, and may have challenges associated with managing growth	• Increase efforts to move cutting-edge research into the marketplace • Improve efforts to connect Maine forest industries and existing business development programs

Product	Opportunities	Challenges	Product-Specific Action Priorities
Biomass Electricity ➢ Electricity produced through combustion of wood residue ➢ Ten stand-alone facilities producing power for the electricity grid, many others associated with manufacturing facilities	• Renewable energy markets in other New England states provide opportunity for qualifying facilities • Current electricity pricing (largely related to high cost of natural gas) allows many facilities to be competitive • Recent federal Production Tax Credit provides financial support • Greenhouse gas abatement programs may provide opportunities	• Historic electricity pricing difficult for existing facilities to compete against • Current high demand for wood chips, and resulting cost increases, is a major threat to competitiveness if electricity prices drop • Resolving acceptance and accounting issues relative to greenhouse gas abatement	• For most existing facilities, major new investment in boiler or emissions control is necessary to participate in regional renewable energy markets
Bio-Based Products	• Nationally, the paper industry has recognized the potential for bio-products to provide additional revenue • Older facilities *may* be better positioned to adapt to emerging technologies • Existing Maine organizations moving forward on development of bio-product technologies • Increasing oil prices may provide an economic opportunity	• Significant technical and economic hurdles remain before commercialization of many bio-products • New products must penetrate existing markets, and may have challenges associated with managing growth • Possibility that emerging technologies will seek subsidies that allow them to compete for feedstock (wood) with existing, unsubsidized product lines • Mill-level reluctance to integrate new, unproven technologies at existing facilities	• Promote research, development and commercialization of bio-based products compatible with existing industry infrastructure • Invest in new technologies, including pilot and demonstration projects • Change Maine tax structure to encourage capital investment • Expose Maine forest product manufacturers to the latest technology developments in this area

Public Support

Maine citizens value the forest products manufacturing industry, and support efforts to support the industry as it moves forward in a time of increasing global competition. As part of this project, INRS commissioned a survey of public attitudes conducted by *Strategic Marketing Services* of Portland, Maine in September 2004. Key findings from this survey include:

- 93% of survey participants believe that maintaining the forest products industry as a significant component of Maine's economy is very important or somewhat important[3];

- Almost two-thirds of survey participants (64%) agreed with the statement "Maine should change its tax policy relating to the forest economy to make it more competitive with other states," while only 14% disagreed;

- When asked if "Maine forest product companies should invest in new technologies to remain competitive," 83% of survey participants answered in agreement, while only 5% disagreed; and

- Nearly 60% of survey participants agreed with the statement "Maine should invest public dollars to improve the health of the forest economy," while only 25% disagreed with this statement.

The survey results were relatively consistent by region of the state. The survey results showed a strong level of public support for steps by both industry and state government to maintain forest products manufacturing as a major piece of Maine's economy.

[3] Due to answers of "don't know" and "neither agree nor disagree", figures do not total to 100%.

Project Summary

The Maine Future Forest Economy Project is an initiative of the Maine Department of Conservation – Maine Forest Service, with additional funding from the Maine Technology Institute, to:

> "[Identify] what is needed to maintain Maine's existing wood using industries, to identify growth opportunities in existing and potential new wood using industries, and to identify what Maine State Government and the industry itself could do to improve the prospects for Maine's forest products industries."[4]

This project contains four distinct phases:

- *Phase 1:* An assessment of the current status and prognosis of Maine's pulp and paper mills, sawmills, secondary wood product manufacturers, engineered wood facilities and wood energy plants;
- *Phase 2:* A statistically valid survey of the attitudes of Maine citizens regarding the forest products industry and attitudes regarding measures that might be taken to enhance its future;
- *Phase 3:* Identification of specific and realistic actions needed to create, sustain, and enhance new wood-using industries in Maine, as well as Maine's forest products industry cluster; and
- *Phase 4:* Presentation of the findings of this report at three public forums organized by the Maine Department of Conservation.

This project is part of Maine state government's ongoing effort to better understand and support the state's forest products industry. The focus of the Maine Future Forest Economy Project is on the manufacturing firms that are part of the forest products industry in Maine. This does not mean that issues relating to the state's landowners, loggers, and land managers and other members of the Maine forest industry are not important; it does mean that the goal of this effort is to identify and address the challenges and opportunities faced by forest product manufacturers.

Maine Department of Conservation

The primary funding for this effort comes from the Maine Department of Conservation (http://www.state.me.us/doc/), and the Maine Forest Service has overseen the project. The design and initiative to undertake this project is the result of efforts on the part of the Maine Forest Service and the Department of Conservation. This report, while enjoying considerable support from the Maine Forest Service and the Department of Conservation, is an independent analysis of Maine's forest products industry and does not necessarily represent the views of the Department of Conservation, Maine Forest Service or the Maine Technology Institute.

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[4] Maine Department of Conservation. *Request for Proposals: Maine Future Forest Economy Project.* October 3, 2003.

Maine Technology Institute

In support of the work described above, and to provide for areas not covered in the original proposal, the Maine Technology Institute (www.mainetechnology.org) provided additional funding to the Maine Future Forest Economy Project. Funding from MTI provided additional resources to conduct interviews with investors and lenders regarding Maine's forest product manufacturing investment climate; commission white papers on Maine's role in the global forest products economy; research opportunities in bio-product development, better quantify Maine forest products manufacturing in a competitive marketplace, and explore how other states are supporting their forest product industries. The Maine Technology Institute also provided funding for the Governor's Council on the Sustainability of the Forest Products Industry, an effort administered by the Maine Department of Economic & Community Development and operating in parallel to the Maine Future Forest Economy Project.

Advisory Committee

During the course of this project, members of an advisory committee -- who have generously donated their time, experience and insight to help make this a better project -- have assisted the Department of Conservation – Maine Forest Service and Innovative Natural Resource Solutions LLC. It should be noted that while these individuals have provided valuable input during every stage of this project, the members of the Advisory Committee and the organizations they work for do not necessarily support or endorse the findings and recommendations contained in this report. The advisory committee members are:

Name	Affiliation
Deborah Feck	Domtar Industries
John Williams	Maine Pulp & Paper Association
Bruce Bornstein	Isaacson Lumber (Board of Directors, Maine Technology Institute)
Chris Fitzpatrick	Machias Savings Bank
Christine Krauss	Maine WoodNet
Jim Robbins	Robbins Lumber
Martin Wilk	Eaton Peabody
Bruce Bryant	Maine State Senator
Habib Dagher	AEWC Center, University of Maine
Greg Moore	Pride Manufacturing
John Cashwell	Seven Islands Land Company
Dan Sosland	Environment Northeast

Research Team

Eric Kingsley and Charles A. Levesque of Innovative Natural Resource Solution LLC (INRS), a natural resource consulting firm with offices in Portland, Maine and Antrim, New Hampshire, conducted the principal research and writing for this report. Other individuals or firms who have contributed material to this report include:

- Patrick Murphy and Brian Harrington, Pan Atlantic Consultants, Portland, Maine;
- Paperloop Benchmarking Services, Atlanta, Georgia;
- Dr. Robert Bush, Blacksburg, Virginia;
- Mark Lennon, Draper/Lennon, Inc., a business development firm, Concord, NH;
- Bill Rockwell, Strategic Resource Systems in St. Johns, Michigan;
- Strategic Marketing Services, Portland, Maine;
- Hasan Jameel, Raleigh, North Carolina;
- Lloyd Irland, The Irland Group;
- Jim Bowyer, St. Paul, MN;
- Al Schuler, U.S.D.A. Forest Service; and
- Keith Bisson, Brunswick, Maine.

These individuals and firms have provided critical information, research and insight that adds to this work; however all findings and recommendations are the responsibility of Innovative Natural Resource Solution LLC unless specified otherwise.

CURRENT POSITION AND CHALLENGES FACING MAINE FOREST PRODUCT MANUFACTURERS

Maine's Forest Industry – An Overview

Throughout its history, Maine has enjoyed a strong and diverse forest industry. The industry has grown and changed over time, but a strong wood products manufacturing base has been a constant in Maine's economy. The forest products industry is recognized as a diverse and interdependent industry, and, as a mature industry, has historically provided a level of stability to Maine's economy[5].

Today, Maine forest industries face unprecedented challenges. The rapid growth of a global marketplace has provided increased trade opportunities for Maine forest products, while at the same time allowing new competitors into markets that Maine companies have long enjoyed.

Changes in Maine's Forest Industry

Maine's forest economy is in the midst of significant changes, and some of these changes are painful to both the state and the industry. Many opinion leaders in the state, both within and outside the forest industry, believe incorrectly that the forest industry is dying. While Maine's forest industry does clearly face a series of challenges – and is in the midst of what will be continued and rapid evolution, the industry remains a pillar of Maine's rural economy, and is taking steps to retain or improve its competitive position. Paper and lumber production remain at or near record levels when measured by volume, though employment in both of these sectors has decreased.

[5] Maine Science & Technology Foundation. *Assessing Maine's Technology Clusters.* June 2002.

Between 1997 and 2002, Maine's forest industry employment declined, from 23,430 employees to 18,130[6]. This loss of over 5,000 jobs in the forest products industry represented a 23% reduction in the labor force. While not as dramatic as employment reductions, industry payroll, the amount of value added activity, and total value of shipments all declined during this time period.

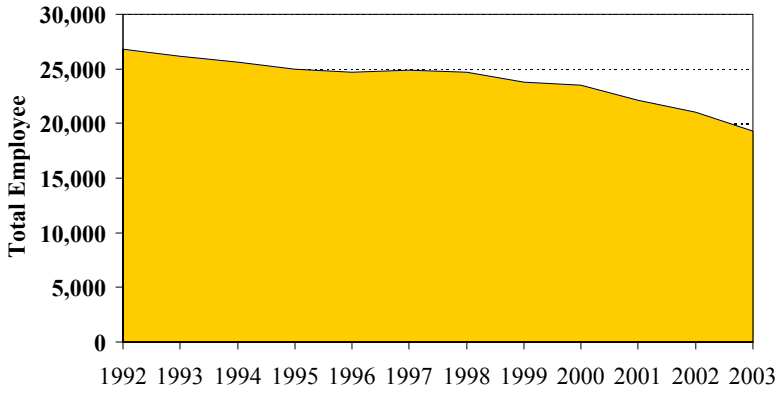
	1997	2002	% Change
Employees	23,430	18,130	-23%
Payroll ($1,000)	$ 900,957	$ 838,552	-7%
Value Added ($1,000)	$ 2,563,869	$ 2,526,752	-1%
Value of Shipments ($1,000)	$ 5,552,376	$ 5,263,591	-5%
Capital Expenditures ($1,000)	$ 296,965	$ 368,454	24%
Productivity ($ shipments / employee)	$ 236,977	$ 290,325	23%
Average wage	$ 38,453	$ 46,252	20%

While employment has decreased, it is critical to note that productivity (as measured in value of shipment per employee), capital expenditures and average wage each grew significantly during the 1997 – 2002 time period. This trend is likely to continue; in fact many Maine forest products manufacturers will need to continue improvements in productivity to remain competitive in the global marketplace. This is the natural evolution of a mature industry going through transition, and is a sign of an industry taking steps to remain competitive.

[6] All data in the discussion of 1997 and 2002 statistics are from the U.S. Census Bureau, totals of NAICS Code 321 (wood product manufacturing), NAICS Code 322 (paper manufacturing), and NAICS Code 337 (household furniture, institutional furniture and kitchen cabinet manufacturing).

According to figures from the Maine Department of Labor[7], Maine's forest industry employment – including pulp & paper mills, sawmills & wood products manufacturing, and forestry & logging – has dropped from 26,785 jobs in 1992 to 19,333 in 2003. Much of this decline in employment parallels a drop in manufacturing employment statewide and nationwide.

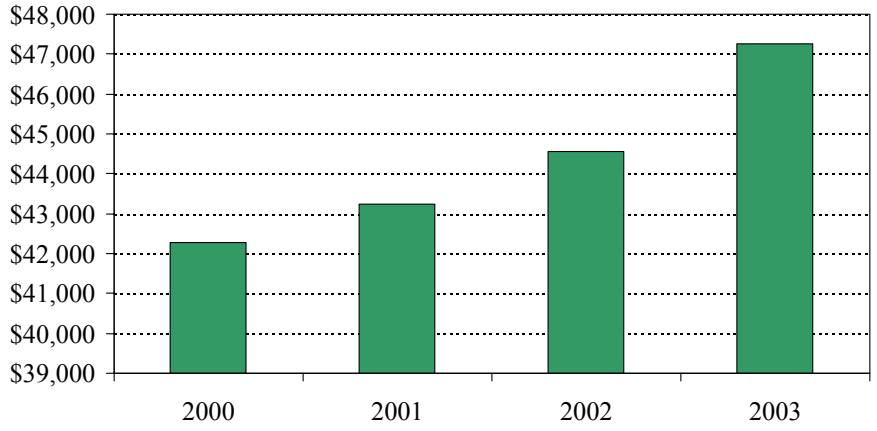
Figure 1. Maine Forest Industry Employment – Paper, Solid Wood and Forestry & Logging, 1992 - 2003[8]



[7] Personal communication with Glenn Mills, Maine Department of Labor, August 2004.
[8] Maine Department of Labor Data: NAICS Code 321 (wood product manufacturing), NAICS Code 322 (paper manufacturing), and NAICS Code 113 (forestry and logging).

However, during the most noticeable period of decline in employment – from 2000 to 2003 – the average wage of forest industry employees rose. For employees in Maine forest product manufacturing, average annual wages grew from over $42,000 a year in 2000 to over $47,000 in 2003.

Figure 2. Average Wages, Maine Paper Mill and Sawmill Employees, 2000 - 2003[9]



This dynamic – decreasing total employment coupled with rising industry wages – may well continue in Maine's forest products industry, and in many cases may be a necessary component of long-term health of the industry. As in all manufacturing, forest products manufacturers must control input costs in order to remain competitive. Part of this is through finding efficiencies in current operations or bringing in new equipment that can operate more economically. Often these lead to fewer total jobs, with remaining retained positions being more stable, higher skilled and higher paid. This is particularly true in Maine because some fixed employee costs, such as high health care costs, drive employers to reduce employment numbers while maintaining production. While often painful, this is a natural and on-going evolution in forest products manufacturing, and recognition of this by leaders inside and outside the forest industry will help Maine move forward in addressing the future of its forest industry.

[9] Maine Department of Labor Data: NAICS Code 321 (wood product manufacturing) and NAICS Code 322 (paper manufacturing)

The Maine Department of Labor periodically provides outlooks on employment levels in Maine industries. In 2003, they released an analysis that showed 2000 employment levels by industry, as well as predictions of employment levels in 2010. It should be noted that such predictions are difficult, and rely upon a number of variables, but this provides an opportunity to look at possible future employment levels in the industry. According to Maine Department of Labor projections[10], total employment in forest manufacturing will fall between 2000 and 2010, with losses in lumber & wood products and paper & allied products; some secondary forest products manufacturing – labeled here as "furniture and fixtures" – is expected to see modest increases in total employment.

Figure 3. Maine Forest Industry Employment Outlook, 2000 and 2010.

Data Source: Maine Department of Labor

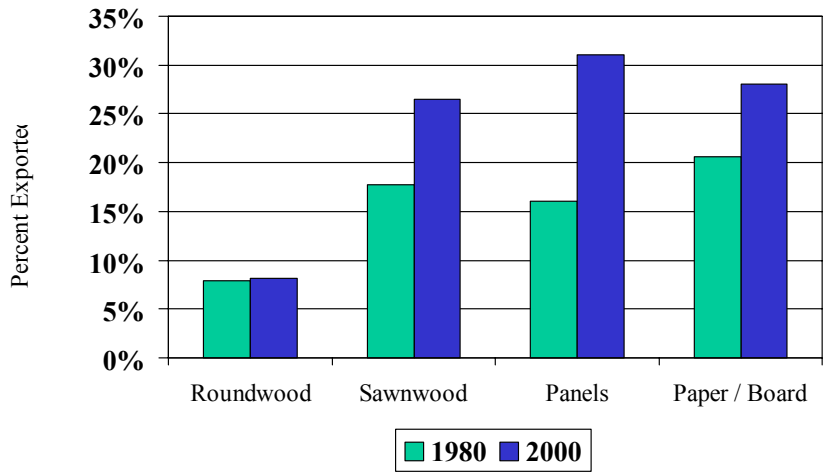
[10] Evans, Dana. *Maine Employment Outlook, 2000 to 2010.* Maine Department of Labor. June 2003.

Rise of the Global Economy

For many Maine forest products manufacturers, the largest change in the last decade has been the rapid rise in the global economy. For larger producers of forest products, this has meant a shift from a regional market to a global market. While a decade ago a mill may have considered its competitors to be other mills in Maine, New England and the Maritimes, today mills face competition from every corner of the globe. As global shipping infrastructure improves and more nations move to turn their forest resources into economic engines, this situation is only expected to continue.

While globalization has created challenges and new competitors for Maine's and the U.S. forest industry, it has also brought opportunity. Nationally, forest products exports have seen significant percentage increases in lumber, panels and paper.

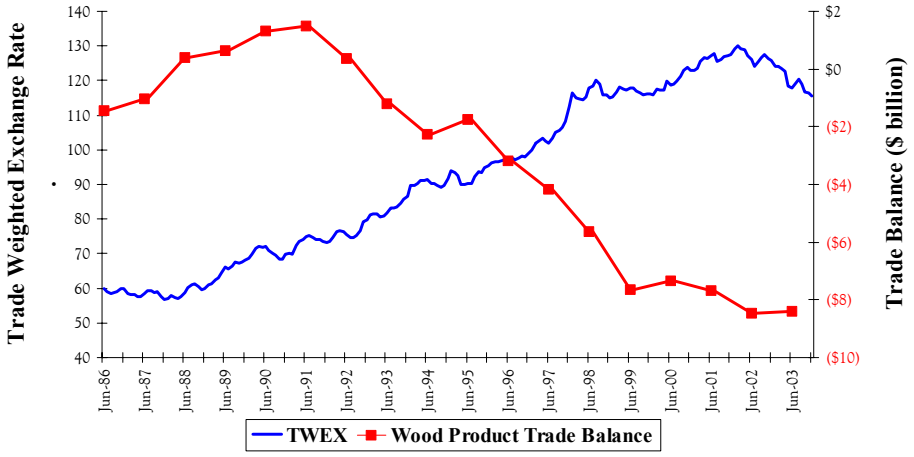
Figure 4. U.S. Exports of Wood Products, 1980 and 2000



The global economy has increased the importance of currency exchange rates to U.S. forest product manufacturers. Due to its proximity to and interaction with Canada, Maine forest industries have long understood how exchange rates impact trade. However, it is increasingly important to monitor other currencies, including the Euro and Asian currencies. When the U.S. dollar is weak against foreign currencies, U.S. manufacturers enjoy an advantage in the market place – their goods are less expensive in export markets, and imports are more expensive here in the U.S. Conversely, when the U.S. dollar is strong American consumers can purchase exported goods less expensively, placing U.S. manufacturers at a disadvantage.

While there is little that individual states and companies can do to have any influence on international exchange rates, it is critically important to understand how it can influence markets for any producer that operates in a commodity market. As shown below, U.S. forestry exports are inversely related to the value of the dollar.

Figure 5. Relationship of Currency Exchange Rate[11] and Forest Exports[12]



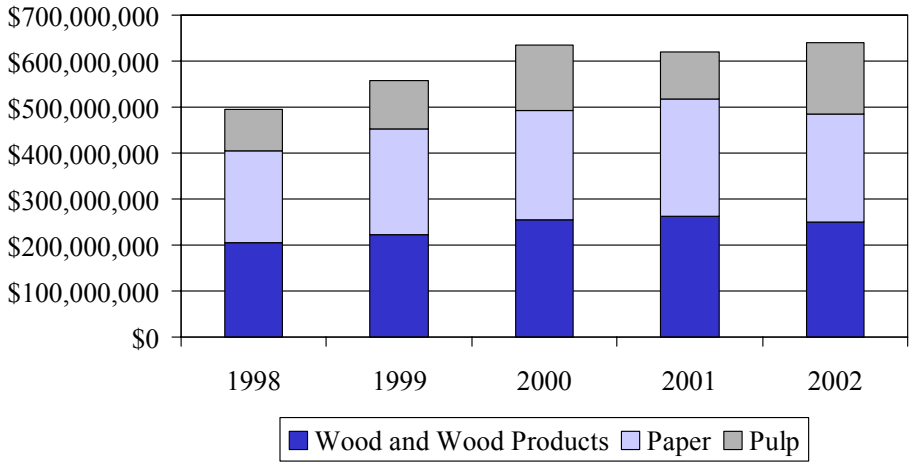
Sources: Federal Reserve Bank and USDA Foreign Agricultural Service

[11] The trade-weighted exchange rate is a composite of a number of foreign currencies that U.S. forest product consumers buy from and U.S. forest product manufacturers sell to, and does not represent one single foreign currency.

[12] Trade balance refers to the value of all exports less the value of all imports. A negative number indicates a period in which the United States imported more forest products than it exported (as measured by value).

Wood and wood products are a major export of Maine, and account for significant international shipments. International exports have grown in value from roughly $500 million in 1998 to nearly $650 million in 2002. For many Maine producers, and thus for the overall health of Maine's forest economy, exports are and will remain an important part of the overall forest economy.

Figure 6. Maine Forest Product Exports, 1998 - 2002

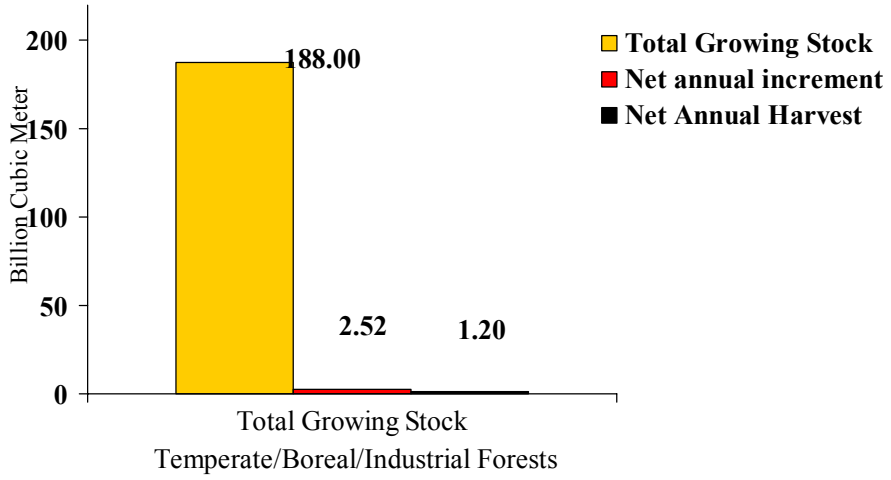


Data Source: Eastern Trade Council

Global Wood Resources

As part of the increase in globalization, Maine producers increasingly compete against foreign sources. Globally, the U.S. Foreign Agriculture Service estimates that there are 188.00 billion cubic meters of wood, with annual growth of 2.52 billion cubic meters. Presently, annual harvests account for 1.20 billion cubic meters. It must be noted that not all of this wood is currently accessible, but more of it will become available as infrastructure reaches further and further into previously inaccessible forests.

Figure 7. Global Forest Resources



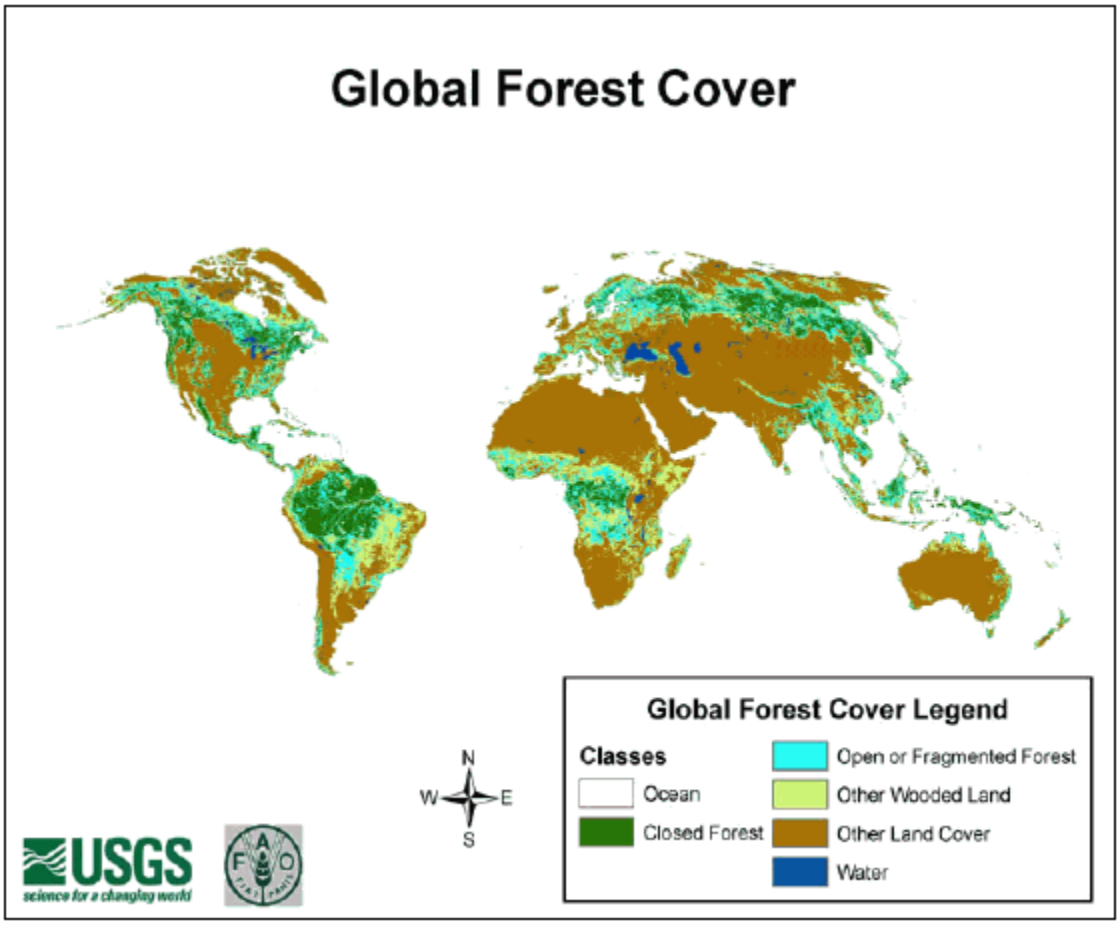
Source: FAO

While there are forests and forestland throughout the world, there are several major regions:

- The boreal forest that runs from Alaska to the Atlantic in Canada and the Northern United States;
- The forests of the U.S. eastern seaboard, much of which runs down the Appalachian Range;
- South America;
- Central Africa;
- The boreal forests of Europe, Russia and Asia; and
- The Pacific Rim forests that run from Japan to New Zealand.

The following map shows a very high level view of global forests.

Figure 8. Global Forest Cover



Need for Constant Innovation

In the face of rising challenges from a global marketplace, Maine forest industries face opportunities and challenges. The speed at which individual companies – and Maine government – respond and adapt to changes in the marketplace will be a major determinant of future success and profitability.

It is important to recognize that there are things that Maine state government can influence, there are issues that industry (alone or collectively) can address, and there are some forces in the global marketplace that cannot be changed – only anticipated and responded to. The one certainty of past success by Maine forest industries, and it is only truer today, is that constant innovation and awareness of changes and opportunities in the marketplace are the hallmarks of success.

Key Factors Influencing Maine's Forest Products Industry

A number of factors influence the competitiveness of Maine's forest products industry: many of them national or global in scope, and all of them are interrelated in complex ways. The following discussion provides a high-level summary of some of the factors that influence a firm's ability to produce a product and sell it into the marketplace at a competitive price. This discussion captures many of the major factors, but is certainly not exhaustive and does not apply universally or equally to each industry sector or firm. Further, it does not account for the ability of firms to differentiate their product in the marketplace or to position themselves in more competitive situations through marketing, investments in research and development, or application of different business strategies. The following discussion should serve as a working list for firms, industry-watchers, legislators and government agencies to monitor and be aware of in making business decisions, consulting on new business strategies or promulgating policies. It contains many of the elements of an industry health tracking system, which might be used to maintain and enhance the healthiest and most vital forest products economy possible for the benefit of the State of Maine.

> **Interest Rates**: Interest rates have direct influence on the cost of capital for new investments, and influence the expectations of financial return by investors. Low interest rates allow firms to deploy capital at low cost. Capital expenditures made against lower costs of capital are exposed to lower risk and provide opportunities for companies to realize higher, more attractive "Returns on Capital Employed", or ROCE. As interest rates increase, certain investments may become less attractive (e.g. riskier) than others and capital will flow to projects and locations where firms anticipate the greatest financial return for a given level of risk exposure. In highly integrated international corporations, the competition for capital is extreme. For example, a multinational firm will compare rates of return for capital expenditures in Maine with those in other parts of the world. This dynamic causes capital to flow where ROCE is maximized. While there is no single metric for gauging the success of capital expenditure decisions, a basic understanding of cost of capital, risk-and-return and ROCE will help to explain

why, where and when capital is deployed in the marketplace. Depending on the timing, location and internal fundamentals, companies may express capital deployment preference to projects in the following categories: "productivity enhancements," "capacity increases," or "efficiency enhancements".

Exchange Rates

Canadian: The U.S./ Canadian exchange rate is extremely important to Maine forest industries, which share a border, forest types and wood supply with some Canadian provinces. While the current strong Canadian dollar favors U.S. manufacturers, this has not always been the case over the past decade and is likely to shift back and forth. An understanding of this dynamic is fundamental in gauging both near-term and long-term outcomes of capital expenditures and public policy discussions.

Other Currencies: While the Canadian exchange rate is likely the most important currency to monitor for Maine's forest products sectors, other currency exchange rates also impact the ability of U.S. firms to compete in foreign markets, and impact the ability of foreign producers to enter the U.S. market. In addition to the relationship between the U.S. and Canadian dollars, the European Union's Euro and key Asian currencies exert strong influences on the value of Maine's forest products in the global marketplace.

It is worth noting that a weak, or weakening, U.S. dollar can lead to higher interest rates and inflationary pressures over the long term. Neither high interest rates, nor increased inflation is desirable for long-term health of Maine's forest products manufacturing.

Taxes: Federal, State and Municipal taxes influence the ability of companies to compete in local, regional and, yes, global markets. Federal taxes, the same for all forest product manufacturers in the U.S., fund a wide range of services. State taxes are used to fund both state and local services. Municipal tax rates, primarily property taxes, vary by community and are used to support a range of community services, including education. All of these tax structures play into the relative cost of competing in business for Maine's forest products industry. The real and perceived differences between states and regions with different state / municipal tax structures strongly influence firms' decisions regarding capital expenditure, capacity expansion and similar sector-enhancing strategies. Pine Tree Zones are an example of recent public policy that has sought to mitigate the influence of tax costs on Maine's forestry sector.

Manufacturing Costs

The following brief discussion of manufacturing costs outlines several significant cost factors that are fundamental in determining a firm's profitability. They should be closely examined by firms, industry-watchers, legislators and

government agencies to ensure an environment for profitability, environmental health and societal well being through gainful employment.

Wood: Wood, the raw material of all sectors in the forest products industry, is the largest single cost for most forest products, and is directly related to the ability of a facility to compete in the marketplace. Current market prices for many species and grades of wood in Maine and the region are at or near all-time highs. Logging infrastructure, land transactions, mill demand fluctuations, foreign competition and wood-alternative technologies all play into the complex supply/ demand dynamic of wood costs. Maine forest products firms should keep a close watch on these costs, especially as the supply and demand of the items manufactured in Maine shifts the profitability of final products up or down.

Labor: The amount and cost of labor is a factor in most forest products, and manufacturers often make investments in labor-reducing technology to help control this cost. In a mature industry, such as Maine's forest products industry, efficiency enhancements may cause the total number of employees in the sector to decrease, while productivity is enhanced. Efficiency enhancements are particularly important in the U.S. forest products economy, where labor costs are higher than in competing offshore mills.

Workers Compensation: Workers compensation costs, a percentage of labor costs, have been trending upward in recent years. Individual firms have no control over the administration of the program, but often take steps to limit claims through aggressive safety programs. Mechanization in many of the forest products sectors (especially timber harvesting and manufacturing) has exerted strong downward influence on workers compensation costs during the past decade. This is an important cost to keep in check for Maine's forestry sectors to remain competitive.

Energy: Due to a number of factors, energy costs are higher in the Northeast U.S. than many other areas of the country. Firms can seek to limit expenses through investments in energy conservation, self-generation, and energy purchasing strategies.

Transportation: Because Maine is a significant exporter of forest products, transportation is an important part of the consumer price of many Maine forest products. Issues such as truck weight limits and the ability of firms to access rail influence transportation costs. Proximity to markets in the population centers of southern New England, New York and the Mid-Atlantic states provides some of Maine's forestry sectors with a competitive advantage.

Indicators of Market Health

For each sector of the forest products industry, there are primary indicators – which may be tracked on a regular basis – that provide a broad perspective on the health of the market for products in this sector. It is important to note that while these indicators provide meaningful information on the health of markets for a particular sector, they do not provide information on the ability of a particular facility or facilities to compete in the marketplace, and do not register all economic activity or variables associated with a particular sector.

Sector	Broad Indicators of Market Health
Paper	Advertising pages in major U.S. magazines
Lumber & Wood Products	Housing starts
Engineered Wood Products	Housing starts
Biomass Energy	Wholesale electricity prices (ISO-New England and NMISA), regional REC prices
Bio-Products	Price of crude oil

Maine's Forest Products Cluster

In today's highly competitive global marketplace, open borders and faster transportation are often seen as diminishing the role of location in competition. There is certainly some truth to this for Maine's forest industry – forest product manufacturers now face competition from remote corners of the globe. At the same time, recognition of the role of groups of interdependent manufacturers – clusters – has grown, placing emphasis on the importance of location.

Clusters are a location-based group of interconnected and interdependent industries that compete with one another *and* strengthen one another through interaction. Cluster members include not only the key manufacturers (e.g., pulp and paper mills, sawmills, wood products firms), but also the suppliers, academic and government institutions that support the industry, trade associations and firms that provide services to the industry. Universally recognized examples of strong clusters in the U.S. are the financial institutions that surround Wall Street in New York City, the wine industry in Napa Valley, Detroit's auto industry and the movie and television industry in Hollywood. Clusters are a highly typical way of industries developing strength, and create a paradox in today's marketplace: "the enduring competitive advantages in a global economy lie increasingly in local things – knowledge, relationships, motivation – that distant rivals cannot match."[13]

Maine has a strong forest products cluster, with very strong relationships among segments of the diverse industry. In Maine, the forest products cluster includes pulp and paper companies, sawmills, secondary wood product manufacturers, biomass energy firms, forest landowners and managers, loggers, equipment manufacturers and distributors, biomass power facilities, university programs, financial institutions, government agencies, trade associations, forest-based recreation businesses, conservation organizations, and transportation firms. "All of these sectors are highly interconnected and interdependent, with each sector playing a key role in maintaining the health of the industry."[14]

The great majority of markets served by participants in the Maine forest products cluster are mature, and sensitive to normal business cycles. Despite strong "cluster strength", the industry is not seen as growing. Firms in the forest products industry "generally seek to maintain or increase market share either by being the low-cost producer of a product or by developing products that offer quality, uniqueness or cost advantages in specific markets."[15]

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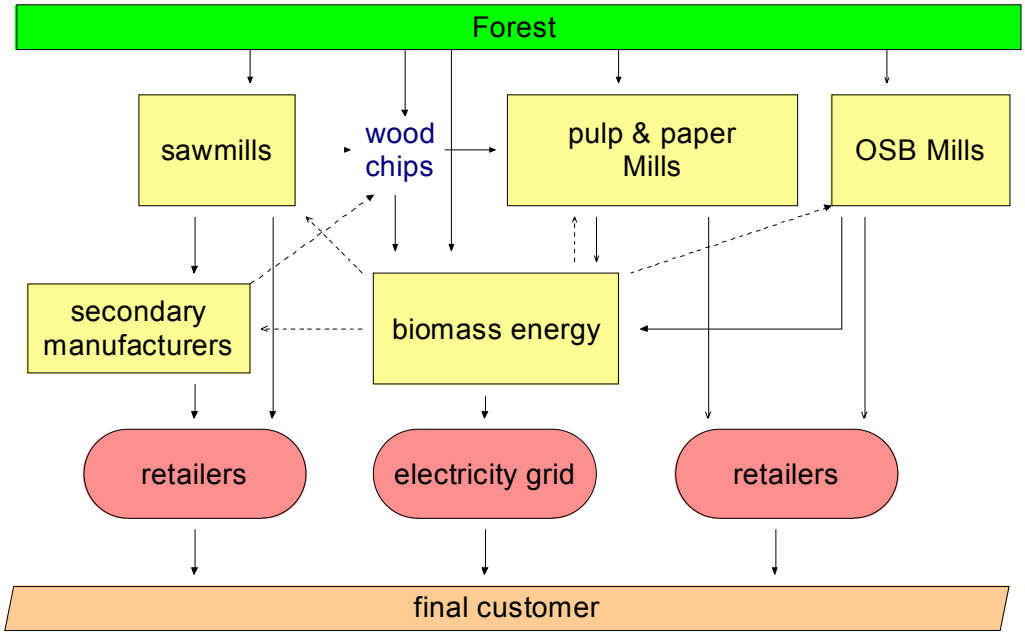
[13] Porter, Michael E. "Clusters and the New Economics of Competition." In *Harvard Business Review*. November – December 1998.
[14] Colgan, Charles, Colin Baker, Nan Butterfield and Michael Cote. *Assessing Maine's Technology Clusters*. Prepared for the Maine Science & Technology Foundation. June 2002.
[15] Colgan, Charles, Colin Baker, Nan Butterfield and Michael Cote. *Assessing Maine's Technology Clusters*. Prepared for the Maine Science & Technology Foundation. June 2002.

The following shows a *simplified* flow chart for Maine's forest products cluster, from forest to consumer. In over-simplified terms, wood flows from the forest to manufacturers, who then move a finished product into the delivery channels (e.g. wholesalers and retailers), who then sell to a final customer. It should be noted that this simplified flow chart does not include each and every sector or transaction in the forest products industry[16]. Similarly, the chart does not necessarily reflect the scale of transactions, but is intended simply to show how wood flows from the forest to the consumer[17].

Figure 9. Simplified Flow Chart of Maine Forest Products Industry Cluster[18]

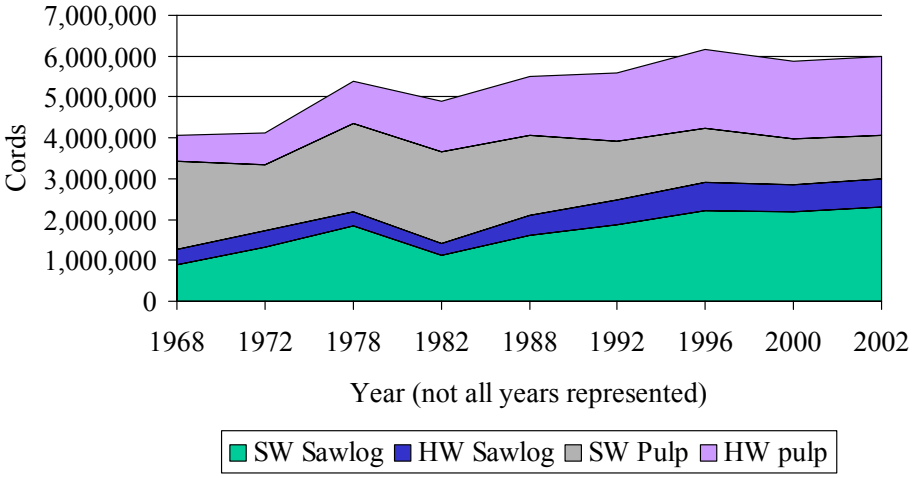


The focus of this effort, the *Maine Future Forest Economy Project*, is on forest products manufacturers (those entities identified in light shading or yellow). This is not to suggest that other actors in the state's forest products cluster –landowners, foresters, loggers, retailers, non-governmental organizations and others – are less important. The cluster is mutually interdependent, and all sectors are critical to the stability and growth of the forest products industry. However, the research and findings in this report focus on forest products manufacturing, and are directed at that part of the forest products cluster.

[16] For example, many manufacturers sell their product to wholesalers, who then sell to retailers.
[17] For example in 2001 the value of shipments from Maine pulp & paper mills was $3.9 billion and from sawmills $297 million.
[18] Adapted from presentation by U. Buehlmann, North Carolina State University and S. D'Amours, FOR@C, ULaval.

Maine landowners harvested roughly 6 million cords of wood in 2002. This volume was almost evenly split between sawlogs (used for the manufacture of lumber and secondary wood products) and pulpwood (use primarily for pulp and paper manufacturing). This harvest volume is up roughly 50% from 1968 levels.

Figure 10. Maine Harvest Volume by Year

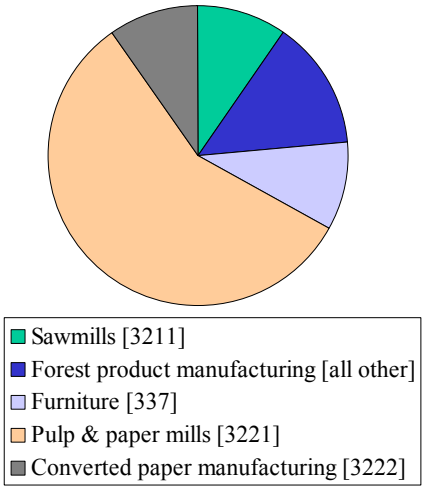


Data Source: Maine Forest Service

While each sector of the forest products cluster is critical to efficient and healthy operation of the entire industry, it is important to note that -- using a number of measures -- pulp and paper manufacturing is the most significant part of the state's forest product manufacturing base. This dominance highlights both the need to work with the pulp and paper mills to secure the future of the entire cluster *and* the opportunity to expand other parts of the cluster.

When measured by number of employees, pulp and paper mills have over half of the employees in the manufacturing part of the forest industry cluster.

Figure 11. Number of Employees by Forest Products Manufacturing Sector, 2001[19]

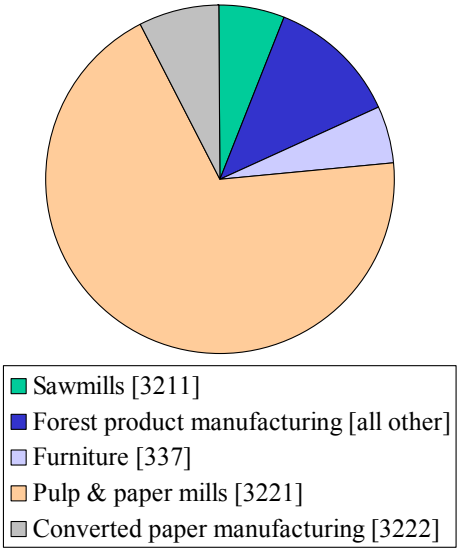


Data Source: 2001 Annual Survey of Manufacturers, U.S. Census Bureau

[19] Note: numbers in brackets above refer to U.S. Census Bureau codes for various industry sectors.

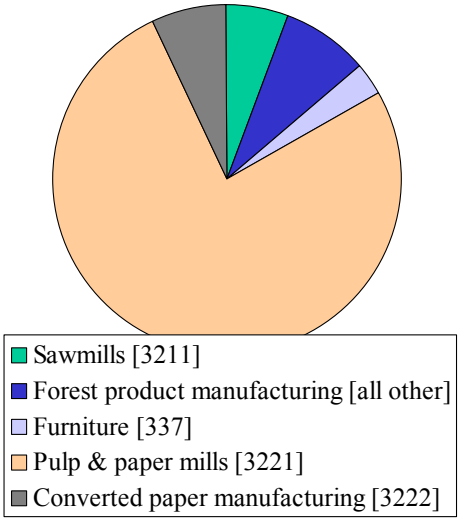
Similarly, Maine pulp and paper mills are large parts of both the payroll and value of shipments from Maine's forest product manufacturing sector.

Figure 12. Payroll by Forest Products Manufacturing Sector, 2001



Data Source: 2001 Annual Survey of Manufacturers, U.S. Census Bureau

Figure 13. Value of Shipments by Forest Products Manufacturing Sector, 2001



Data Source: 2001 Annual Survey of Manufacturers, U.S. Census Bureau

The challenge for Maine and its forest industries is to translate the existing strength of the forest industry cluster into a healthier and more stable industry, with innovation at its core. Obviously, member industries and companies have a core role to play in the development of this culture. The key to success of Maine's forest industries going forward will be productivity. "Companies can be highly productive in any industry…if they employ sophisticated methods, use advanced technology, and offer unique products and services."[20] Maine companies are seeking to do this now – the key questions is how to help, incent, and allow Maine industries to be as competitive as possible.

[20] Porter, Michael E. "Clusters and the New Economics of Competition." In *Harvard Business Review.* November – December 1998.

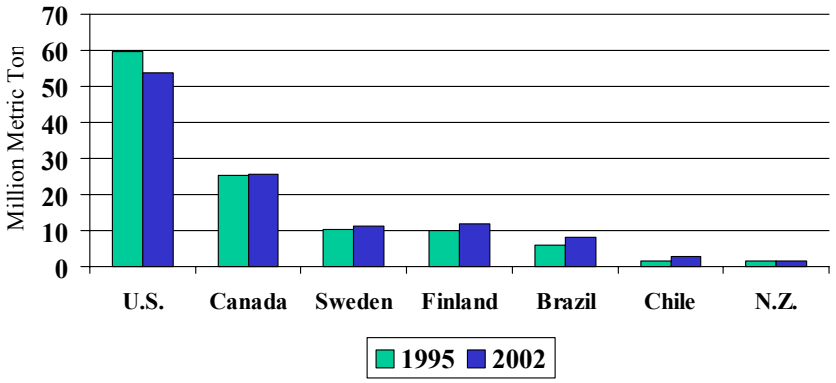
Pulp & Paper Sector

Industry Overview

The pulp & paper industry has long been a dominant component of Maine's forest products industry, and provides a significant source of employment in many Maine communities (with high wages and benefits), a major wood market, and is integral to the operation of the state's entire forest industry.

While the importance of the pulp & paper industry – both to the forest industry as a whole and to Maine's economy – cannot be underestimated, the pulp & paper industry in Maine and in the nation has been facing new challenges in the global economy. Other countries have been increasing their production, while the U.S. has seen a decrease in pulp production since 1995.

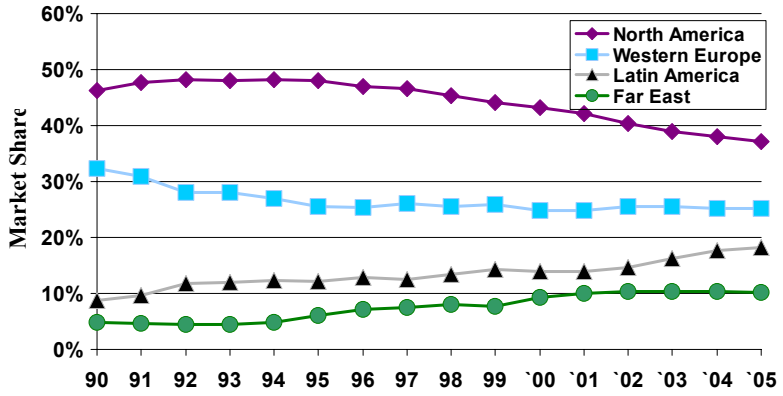
Figure 14. World Pulp Production, 1995 and 2002



Data Source: PaperLoop.com

This decrease in U.S. pulp capacity[21] has led to a decrease in the North American market share for pulp capacity. North American market share has dropped from almost half in the mid-1990s to thirty eight percent today, with continued loss of market share expected in coming years[22].

Figure 15. Regional Shares of World Market Pulp Capacity



Data Source: RISI

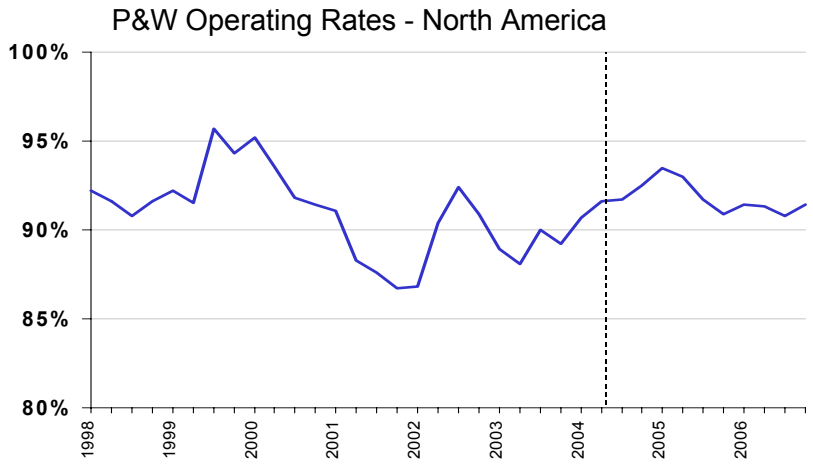
The U.S. pulp & paper industry as a whole has moved away from a "production push" business model, where facilities were built and operated to the point of flooding markets. The industry is now managing operations to bring production in line with demand, specializing where opportunities arise and seeing greater profitability as a result. Due to the capital-intensive nature of the paper industry, mills generally need to operate at over 95% utilization in order to see sustained profits. Because of this, some companies have recently closed underutilized mills, and the industry as a whole is extremely cautious about expansion at this time.

[21] Capacity is the ability to produce a particular product, as differentiated from production, which is the actual output of a product.

[22] Young, Rodney. RISI President. *Outlook for the World Pulp Market.* Paper Week Seminar, New York, NY. March 22, 2004.

Mill closings, coupled with recent upturns in the U.S. economy and a weakening of the dollar, have led to an increase in overall production from remaining mills, and may provide an opportunity for Maine mills. For example, printing and writing grades (the majority of Maine's capacity) have seen North American operating rates rise from a low of 83% in 2001 to current levels of 92%, with modest increases expected in the next few years[23].

Figure 16. Operating Rates for North American Printing & Writing Grade Mills

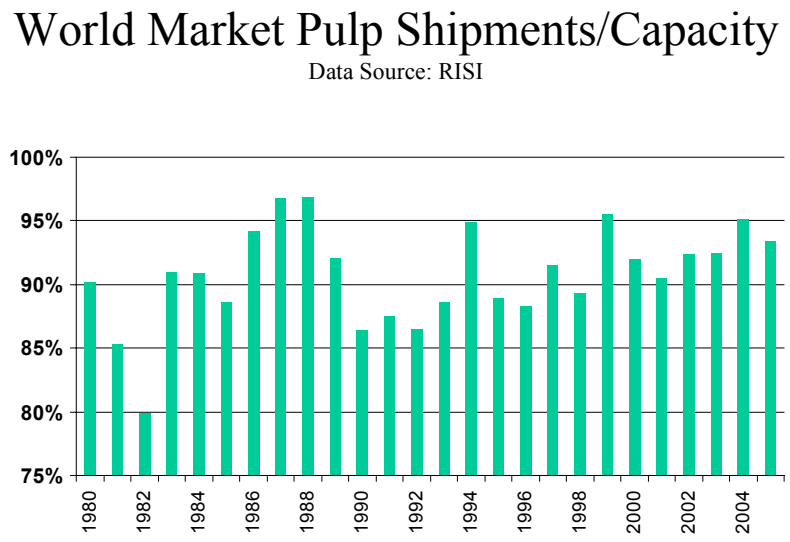


Data Source: RISI

[23] Maine, John. RISI Vice-President. *Printing & Writing Paper Outlook: Demand Recovery Arrives, but Strong CN$/Euro Hampers Canadian and European Mill Profitability.* Paper Week Seminar, New York, NY. March 22, 2004.

Similarly, overall market pulp production (shipments as a percentage of capacity) has been growing in recent years, with roughly 95% of capacity expected to be utilized in 2004.

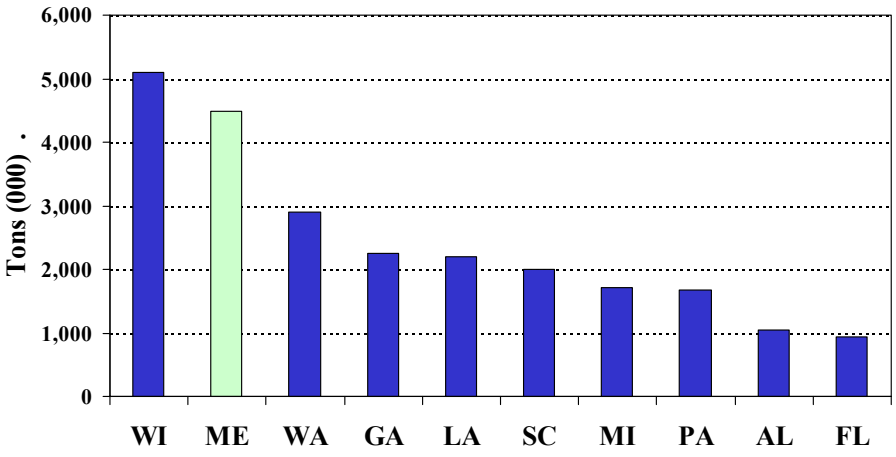
Figure 17. Global Market Pulp Production as a Percentage of Capacity



Maine as a Paper Producing State

Maine is a leading producer of paper; in 2001, Maine was the second largest manufacturer of paper in the U.S. as measured by volume, with roughly 4.5 million tons in production. In the Northeast, Maine is clearly the dominant paper producer.

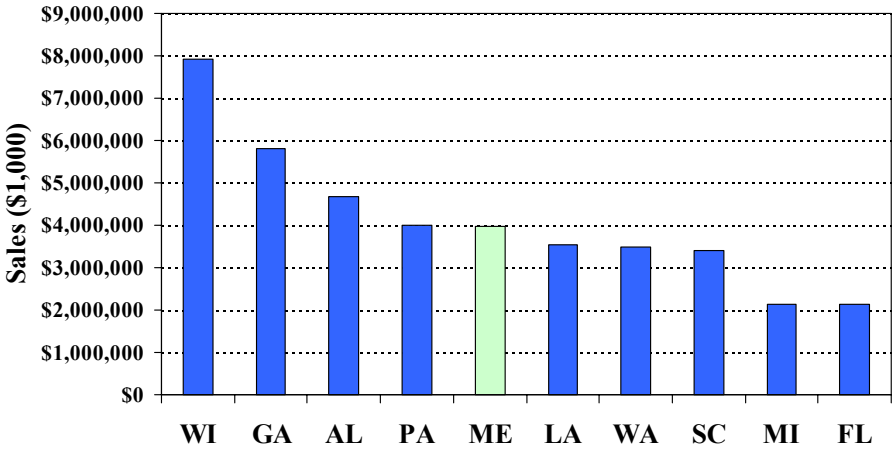
Figure 18. Top Ten Paper Producing States (by volume), 2001



Data Source: American Forest & Paper Association

In 2001, Maine was the fifth largest manufacturer of paper in the U.S. as measured by value of shipments, with roughly $4 billion in sales.

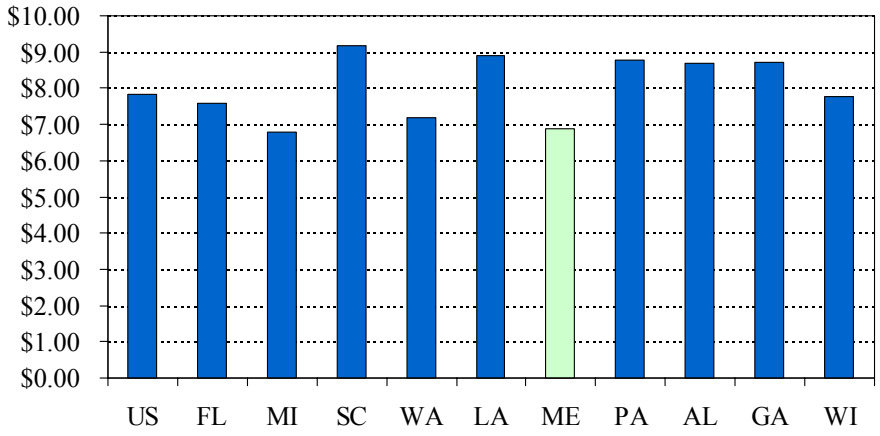
Figure 19. Top Ten Paper Producing States (by value), 2001



Data Source: US Census of Manufacturers

Nationally, paper producers averaged $7.84 in sales for each $1.00 of payroll (wages and benefits) in 2001. Maine ranks below this average, with $6.89 in sales for each $1.00 of payroll. This is not a reflection of the work ethic of Maine papermakers, but more likely a reflection of the fact that many Maine mills have older, less efficient machines and pay higher than average benefits.

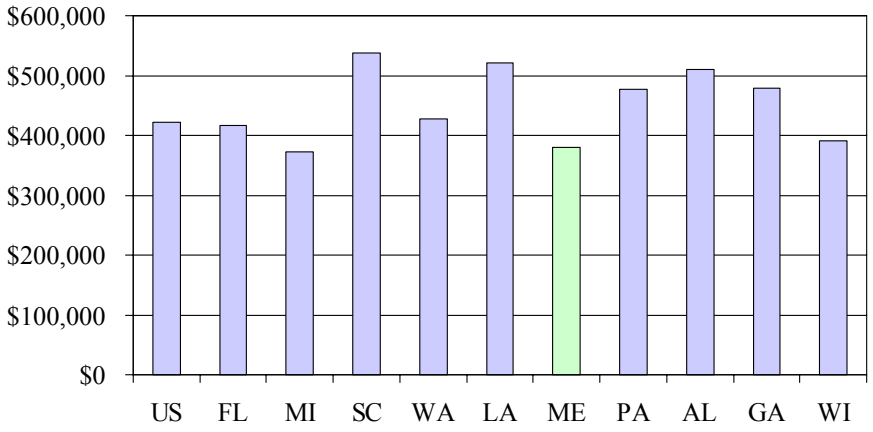
Figure 20. Sales Per Dollar of Payroll, 2001



Data Source: US Census of Manufacturers

Similarly, when sales are viewed by employee (a way to discount the impact of regional wage and benefit differences), the U.S. paper industry averaged $421,814 in sales per employee in 2001. Maine mills average $379,761 per employee. Again, this is likely attributed to the age of Maine's machines when compared to other facilities nationally.

Figure 21. Sales Per Employee, 2001



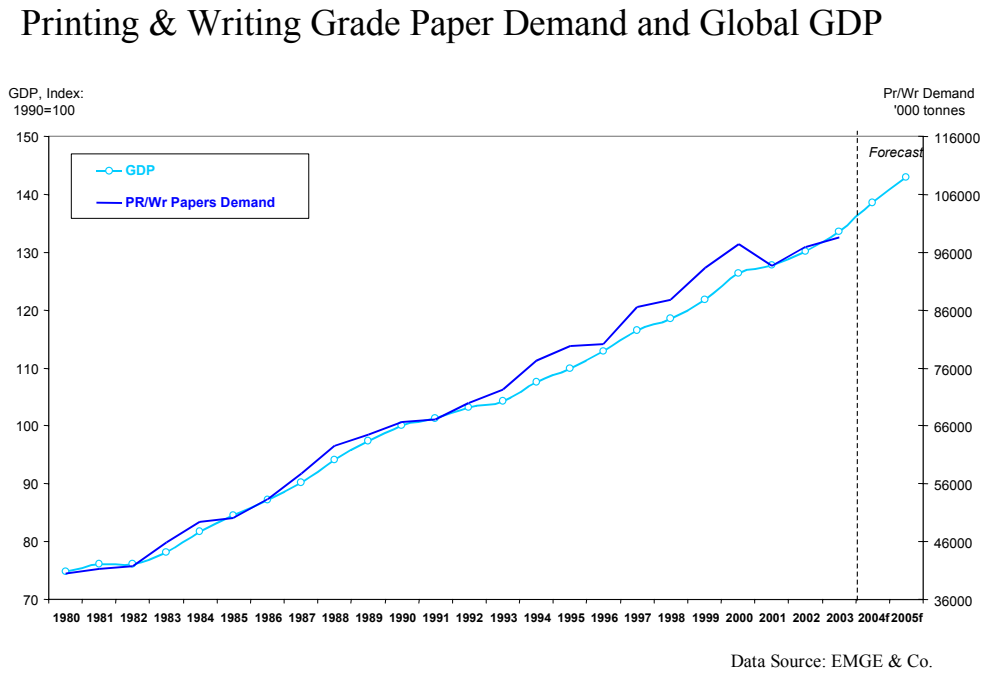
Data Source: US Census of Manufacturers

Printing & Writing Grades

Maine tends to manufacture high-end paper grades, with the bulk of production focused on printing and writing grades. These grades of paper are used in publications, for office and correspondence use and in books. While the relationship is not perfect, printing and writing grade demand has historically tracked global economic activity[24]. In recent years, North American producers have seen some of this market growth lost to offshore competitors. As global economic activity has begun to rebound, and growth is expected to continue through late 2005, the near-term offers an opportunity for U.S. mills producing printing and writing grades to develop or increase profitability, taking advantage of not only market growth but a weak dollar (when compared to Canadian and European currencies).

With current changes in the exchange rate with major trading partners, U.S. mills are benefiting, improving their overall competitive position by $60 to $90 per ton[25]. This improvement (likely temporary) may allow some Maine mills a window to carefully evaluate their facilities, looking for opportunities to add technology or capacity to improve their long-term future.

Figure 22. Historic Printing & Writing Demand and Global Economic Activity

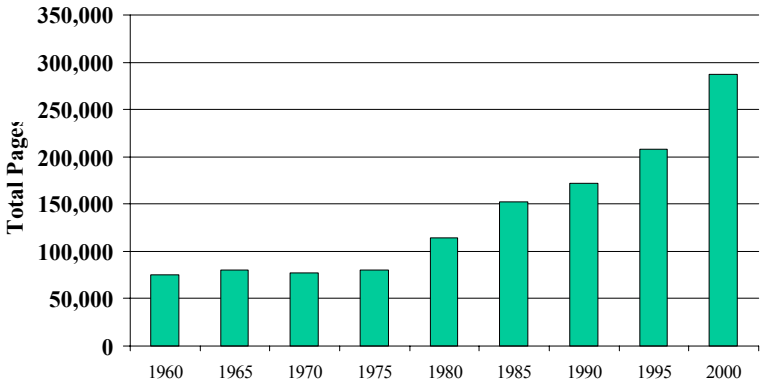


[24] Young, Rodney. RISI President. *Outlook for the World Pulp Market.* Paper Week Seminar, New York, NY. March 22, 2004.

[25] Temple, Dan. Paperloop Benchmarking Services. *Saving the Good Mills*. June 14, 2004.

A leading indicator used to measure the health of printing and writing paper demand is the number of advertising pages in major U.S. magazines. While this indicator is not perfect, it tends to be a good general benchmark for the strength of printing and writing paper markets generally. In the past forty years, the number of advertising pages in major U.S. publications has grown substantially, from 74,861 pages in 1960 to 286,932 in 2000 – an increase of over 380% in four decades.

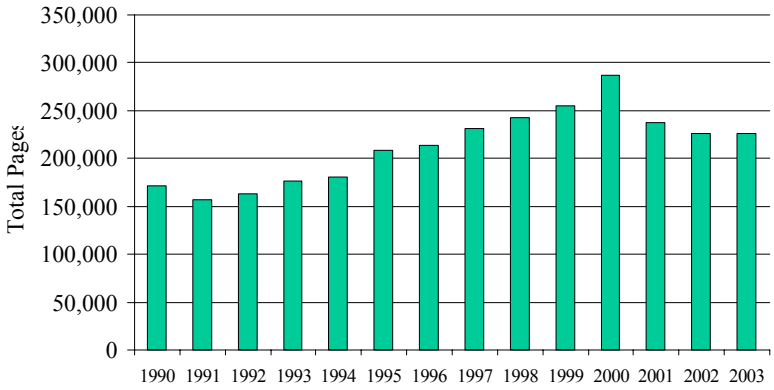
Figure 23. Advertising Pages in Major U.S. Magazines, 1960 - 2000



Source: Publishers Information Bureau

Advertising page increases were steady in the 1990's, but began to fall off in 2001, coinciding with a recession in the United States. This economic downturn, coupled with a rise in the use of internet and cable advertising, has led to a reduction in total advertising pages. Advertising pages fell from their high in 2000 to 226,049 pages in 2003. This drop – an indicator of broader overall decline for printing and writing paper, has forced a number of mill closings in the U.S., and has impacted overall industry profitability.

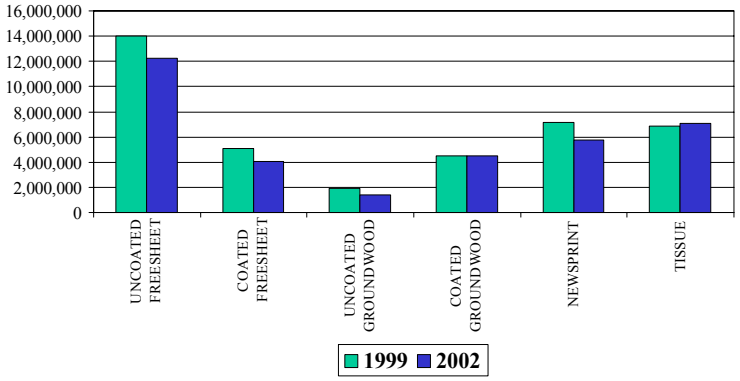
Figure 24. Advertising Pages in Major U.S. Magazines, 1990 - 2003



Source: Publishers Information Bureau

When viewed by grade, almost all major paper grades produced in Maine have seen market loss in recent years, leading to challenging times for the industry, facility closings and temporary shut-downs, industry consolidation and price reductions.

Figure 25. U.S. Shipments, By Grade, 1999 and 2002



Data Source: American Forest & Paper Association

Maine's Pulp & Paper Industry

Maine has a large pulp and paper industry, with twelve operating mills. These facilities provide an enormous market for wood, and are the largest single sector of Maine's forest industry. Maine's currently operating paper mills include:

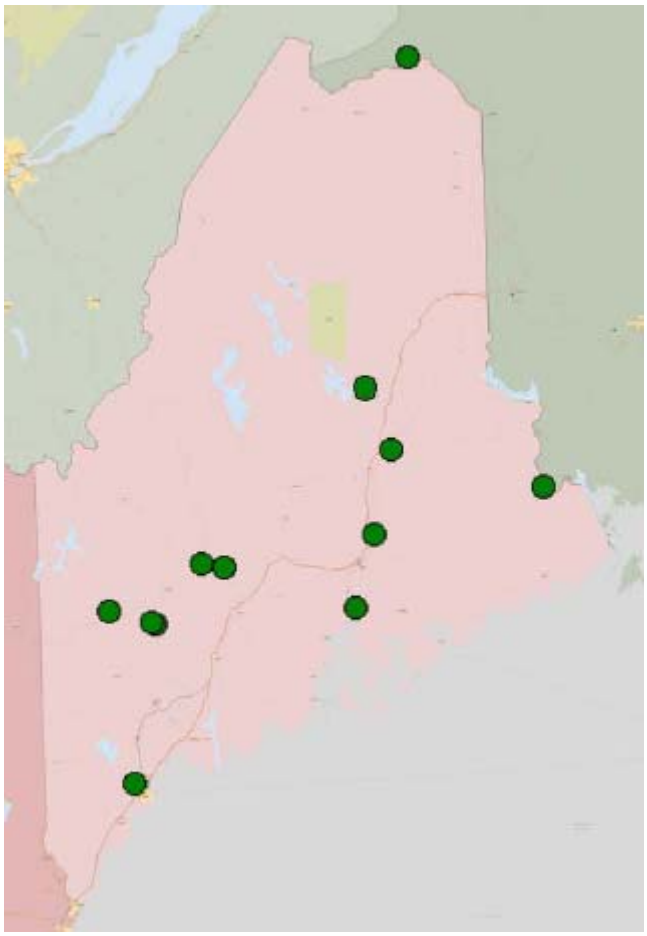
Company	Town
Domtar	Woodland
Fraser	Madawaska
Georgia-Pacific	Old Town
International Paper	Jay
International Paper	Bucksport
Katahdin Paper	Millinocket
Katahdin Paper	East Millinocket
Lincoln Paper & Tissue	Lincoln
Madison Paper	Madison
Mead Westvaco[26]	Rumford
SAPPI	Skowhegan
SAPPI	Westbrook
Wausau-Mosinee Paper	Jay

Maine's pulp and paper mills produce a range of products, and range from relatively large, high efficiency operations to small facilities making specialized products. Maine mills operate in a difficult national and global economic environment; the industry as a whole has shown returns below the cost of capital for at least a decade[27]. While there are exceptions, Maine mills tend to be older and smaller than mills in other parts of the world, or even other parts of the U.S. For Maine pulp and paper mills, continued investment in efficiency and productivity improvements is critical to competitiveness. As noted in a recent report to the Maine Science & Technology Foundation:

> "Despite aging infrastructure in Maine, many mills have become quite innovative in their efforts to remain competitive. Each mill has a unique cost structure, and continuous attention is paid to reducing costs per ton of paper produced. Some mills report costs per ton of paper produced are equal to or less than those of five years ago, despite increases in labor and benefit costs over the same time period."[28]

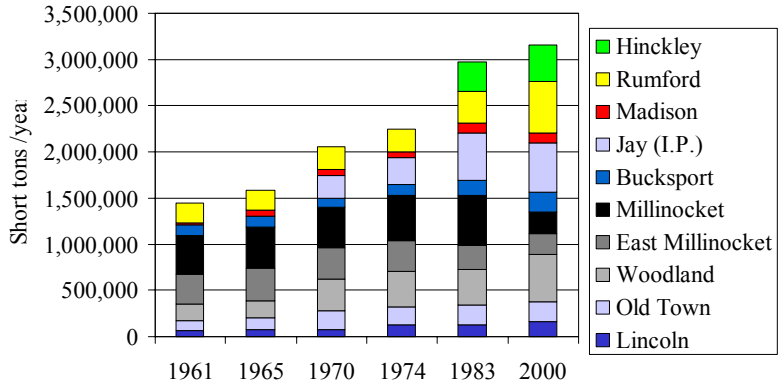
[26] On January 18, 2005 Mead Westvaco announced plans to sell its paper division, including the mill in Rumford, to the investor group Cerberus Capital Management L.P.
[27] Amidon, Tom. Director, Empire State Paper Research Institute. *New Forest Based Biomass Materials.* Presented at the Maine Bioproducts Forum, Orono, Maine. March 2, 2004.
[28] Colgan, Charles, Colin Baker, Nan Butterfield and Michael Cote. *Assessing Maine's Technology Clusters*. Prepared for the Maine Science & Technology Foundation. June 2002.

Figure 26. Geographic Distribution of Maine Pulp & Paper Mills



Maine grew steadily as a paper producing state, with steady capacity growth from 1960 through the late 1980's and early 1990's[29]. This mirrored a general U.S. trend, where investments in new capacity were made to meet increasing demand. In the mid 1990's, following the legislature's establishment of the Business Equipment Tax Reimbursement (BETR) program, a number of paper mills – including mills in Jay, Madison and Madawaska – made investments to improve productivity or capacity.

Figure 27. Maine Pulp Mill Capacity, 1961 - 2000[30]



Data Source: USFS Forest Products Laboratory, Smith, Rice & Ince

Since that time period, the Maine industry, and the U.S. industry in general, has largely stopped adding capacity[31], and some machines and mills have been shut down. In recent years, mills in Old Town, Lincoln, Millinocket, and East Millinocket have announced shut downs or have actually closed. Each of these facilities has re-started (or, in the case of Old Town, continued operations), demonstrating that there are opportunities for new owners or new infusion of capital to benefit Maine mills. However, mills in Brewer and Westbrook (pulp) have closed, and are not expected to reopen. These mill closings – both permanent and temporary – point to the struggles of the state's paper industry. More importantly, this points to Maine's part in the nationwide reduction of mill capacity in the

[29] Smith, Brett R., Robert W. Rice and Peter J. Ince. *Pulp Capacity in the United States, 2000.* USDA Forest Service, Forest Products Laboratory, General Technical Publication FPL-GTR-139. September 2003.

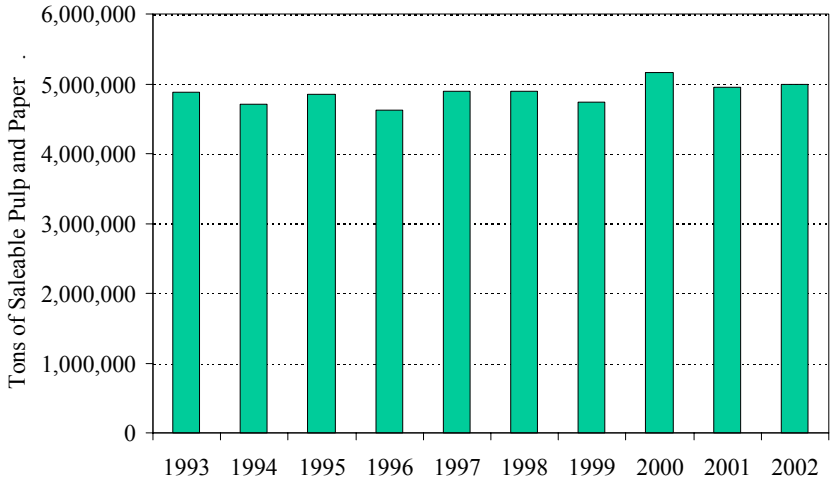
[30] This chart does not include all Maine facilities, with historic information for the Brewer mill and the Otis Mill in Jay unavailable.

[31] Of the 609 million tons of new capacity anticipated for printing writing grades from 2003 – 2006, 87% is from mills outside the United States.

sector of mills with the oldest and least efficient equipment as the industry worldwide seeks to balance production with demand.

Maine pulp and paper mills have shown a relatively steady output in the last decade, with output ranging from a low of 4.6 million tons of saleable pulp and paper produced in 1996 to a high of 5.2 million tons in 2000.

Figure 28. Production of Pulp *and* Paper at Maine Mills, 1993 - 2002[32]

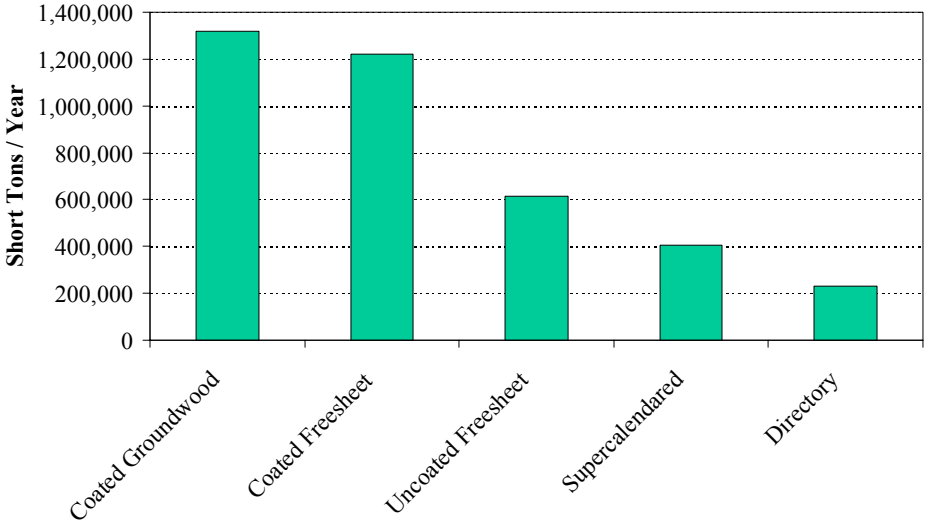


Data Source: Maine Pulp & Paper Association

[32] These figures do not include production from mills in Lincoln and Brewer

Maine's mills tend to focus on printing and writing grades, with some mills producing specialty grades, tissue, or market pulp. The capacity of Maine mills to produce printing and writing grade paper is shown below.

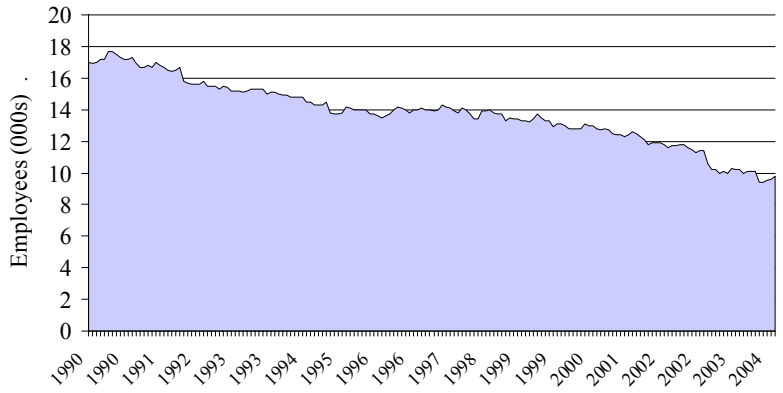
Figure 29. Capacity of Maine Paper Mills, Printing & Writing Grades



Data Source: Paperloop

Maine pulp and paper mills have long been a very large employer in rural Maine. Today, a competitive global marketplace demands that mills control costs in every manner possible. This includes seeking ways to minimize the number of employees. Between 1990 and 2003, Maine paper mill employment decreased from 17,200 to 10,200[33]. As mills continue to seek ways to control costs, Maine may anticipate continued job loss in this sector. However, it should be noted that remaining jobs in this sector are often more productive -- and as a result more secure -- following investments or shifts in production that may result in some job reduction.

Figure 30. Pulp & Paper Employment in Maine, 1990 - 2004

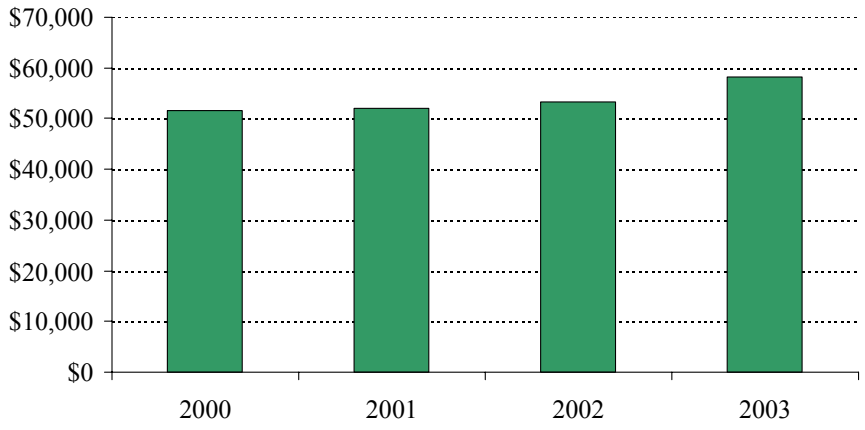


Data Source: US Department of Labor

[33] Bureau of Labor Statistics, U.S. Department of Labor.

Employees in Maine's pulp and paper mills receive the highest average wage of any forest products manufacturing sector. Employees in the pulp and paper received an average wage of almost $52,000 in 2000; by 2003 this had increased to $58,000[34].

Figure 31. Average Annual Wage, Maine Pulp & Paper Industry, 2000 - 2003

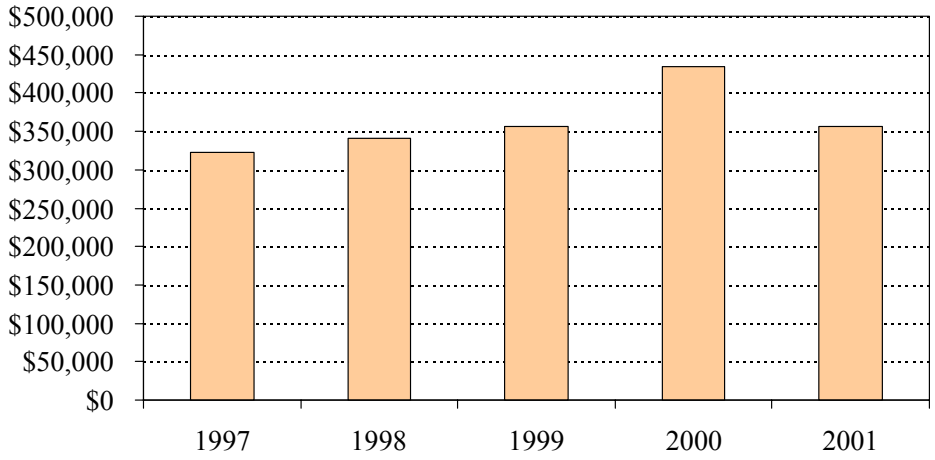


Data Source: Maine Department of Labor

[34] This wage data does not include health or retirement / pension benefits.

From 1997 to 2001, Maine mills have become more productive, when measured as the value of shipments per employee. This indicator did decrease in 2001, the last year data are available for; this is likely due to global decreases in paper prices in 2001 coupled with modest reductions in Maine's pulp and paper production.

Figure 32. Value of Shipments per Employee, Pulp & Paper Mills, 1997 - 2001



Data Source: U.S. Census of Manufacturers

Maine's Competitive Position

As part of the Maine Future Forest Economy Project, with funding provided by the Maine Technology Institute, Innovative Natural Resource Solutions LLC engaged Paperloop Benchmarking Services (Paperloop) to provide average cash cost for Maine and competing geographic regions, by grade, as well as North American and Global Cost Curves, again by grade. This information is critical to helping Maine industries and policy makers understand where the state fits in the competitive global marketplace. Paperloop is a premier news and information provider for the pulp, paper, converting, and forest products industry[35]. Paperloop does not have access to exact figures on a mill-by-mill basis, but uses known information on facilities to model costs per ton of product. Paperloop regularly provides competitive information to the pulp and paper industry, and has added significantly to the information available for this report.

Paperloop provided information on the following pages specifically for this project. Specific mills and machines are not identified by name, but the information provides a very revealing look at Maine's competitive position for certain grades. All information is for the first quarter of 2004. Paperloop provided only the cost curves and input cost spreadsheets; Innovative Natural Resource Solutions LLC interpreted this information. While there is significant variation from mill to mill, "Maine does not appear to be overly high cost, except at some key mills."[36] Areas of key concern, as shown in the following graphs, are Maine's relatively high energy costs (particularly electricity), and the need to return to and secure Maine's historic position as a state where mills could secure wood at globally competitive prices. Maine has a number of advantages over other areas of the country (and sometimes the world), including an abundance and variety of wood, a world-class infrastructure, and a location proximate to the largest market in the world. Maine's challenge is how to build upon these strengths, while addressing high-cost areas, to secure the future of the pulp & paper industry.

When reviewing this information, it should be noted that self-generation of electricity is reflected at its actual cash cost, and does not include the expense of capital necessary to construct an electrical and thermal heat generation facility. Some facilities that sell their excess electricity onto the grid show a negative number for electricity. This figure would change dramatically if these facilities stopped selling excess output, and do not reflect the investment necessary to build electricity-generation facilities.

One area that Paperloop does not have specific, detailed data on is the cost of taxes at a particular facility. Georgia Pacific has provided information to the Maine legislature that shows that in 2001 property taxes at its facility in Old Town amounted to $12.41[37] per ton in Maine, the highest in its company. This was $7.09 per ton above the Georgia Pacific average, and $10.47 per ton above their lowest property tax-per ton mill in

[35] Paperloop Benchmarking Services can be located at www.paperloop.com
[36] Personal communication, Dan Temple, Paperloop Benchmarking Services, June 29, 2004.
[37] According to information provided by Georgia Pacific, Maine's BETR reimbursement program brings the property tax cost per ton down to slightly over $10.00 per ton, still the highest in the company.

Bellingham, Washington. This information is not reflected directly in the Paperloop data, but is provided to allow users of this information to estimate how a decrease of $7 - $10 per ton in production costs might impact the industry's competitiveness[38].

Coated Groundwood

Coated groundwood (CGW) is a grade of paper traditionally used for mass publications. Typical uses include magazines, catalogues, and newspaper inserts. Maine's capacity of 1.3 million short tons of coated groundwood represents 21% of North American capacity. In Maine, coated groundwood is produced at the following mills:

Company	Town
Fraser	Madawaska
International Paper	Jay
International Paper	Bucksport
Mead Westvaco[39]	Rumford

As shown in the following spreadsheet, the average Maine mill makes a short ton of coated groundwood for $576. This is less than the competing regions of Wisconsin, Quebec, the U.S. (average), and Canada (average). Of the regions evaluated, only Europe, which produces the competing grade "wood containing coated" (WCC), is a lower cost producer than Maine. However, it must be noted that there are wide variations in the cost by mill, and not all Maine mills are highly competitive on a global basis. In this grade, areas where Maine is high-cost compared to competing regions include labor (both hourly and salaried) and maintenance. Both of these may be a function of the age of machines in this grade; older machines typically require more labor and more maintenance than newer machines.

[38] Similarly, Fraser Papers – Madawaska shared their local property tax burden per ton with a legislative committee in 1999. Thir data indicates a company-high local tax burden of $12.05 per ton in Maine, a company-low local tax burden of $1.28 per ton in New York, and an unweighted average local tax burden of $4.81 per ton company-wide.

[39] On January 18, 2005 Mead Westvaco announced plans to sell its paper division, including the mill in Rumford, to the investor group Cerberus Capital Management L.P.

RESULTS

Q1-2004 CGW & WCC

TOTALS AND WEIGHTED AVERAGES

Mill		Capacity		US$/FST							
						Energy		Labor			
Product	Region	FST/D	FST/Y	Fiber	Chemicals	Electrical	Fuel	Hourly	Salary	Materials	Cash Cost
Coated Groundwood	**Maine**	**3,667**	**1,319,940**								
Weighted Average				**129**	**156**	**30**	**33**	**117**	**37**	**73**	**576**
Minimum				**73**	**139**	**14**	**21**	**86**	**30**	**67**	**491**
Maximum				**206**	**174**	**74**	**90**	**163**	**50**	**84**	**655**
Coated Groundwood	**Wisconsin**	**2,670**	**961,200**								
Weighted Average				**207**	**151**	**40**	**30**	**114**	**30**	**65**	**638**
Minimum				**155**	**133**	**22**	**21**	**89**	**21**	**62**	**547**
Maximum				**242**	**162**	**65**	**54**	**145**	**50**	**70**	**698**
Coated Groundwood	**Qubec**	**1,185**	**426,554**								
Weighted Average				**149**	**201**	**53**	**52**	**83**	**24**	**66**	**629**
Minimum				**95**	**173**	**50**	**36**	**58**	**19**	**51**	**546**
Maximum				**215**	**221**	**58**	**66**	**111**	**25**	**74**	**735**
Coated Groundwood	**USA**	**14,071**	**5,065,380**								
Weighted Average				**151**	**150**	**40**	**37**	**99**	**34**	**66**	**577**
Minimum				**53**	**87**	**0**	**16**	**25**	**9**	**18**	**477**
Maximum				**481**	**180**	**74**	**104**	**163**	**59**	**84**	**698**
Coated Groundwood	**Canada**	**3,445**	**1,240,154**								
Weighted Average				**131**	**196**	**51**	**42**	**89**	**25**	**67**	**602**
Minimum				**95**	**168**	**43**	**30**	**58**	**17**	**51**	**546**
Maximum				**215**	**221**	**60**	**66**	**158**	**56**	**74**	**752**
Wood containing Coated	**Europe**	**31,092**	**10,882,330**								
Weighted Average				**179**	**139**	**44**	**60**	**46**	**31**	**47**	**545**
Minimum				**90**	**88**	**(86)**	**33**	**21**	**15**	**37**	**456**
Maximum				**266**	**193**	**105**	**131**	**90**	**63**	**62**	**673**

O:\Projects\Innovative Natural Resources Solutions\[Region & World region Data.xls]CGW & WCC
Note: the above data is based on the mills in Paperloop Benchmarking Services database.

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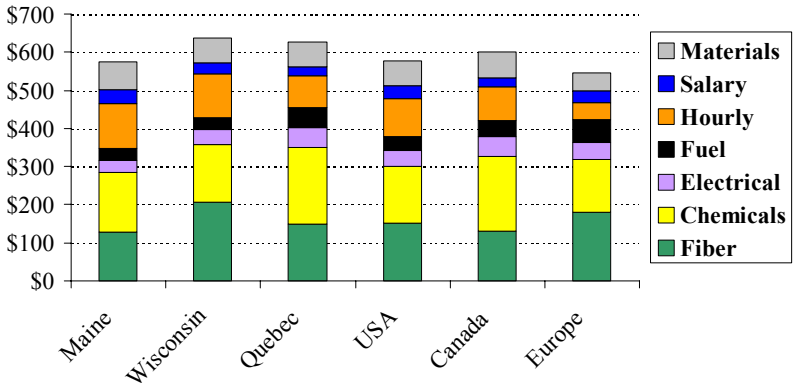
The information presented above is provided again in graphic form, which shows Maine's average production of coated groundwood is competitive with other regions of the world, and at the average U.S. cash cost.

Figure 33. Weighted Average Cash Cost/Short Ton, Coated Groundwood, Q1 2004



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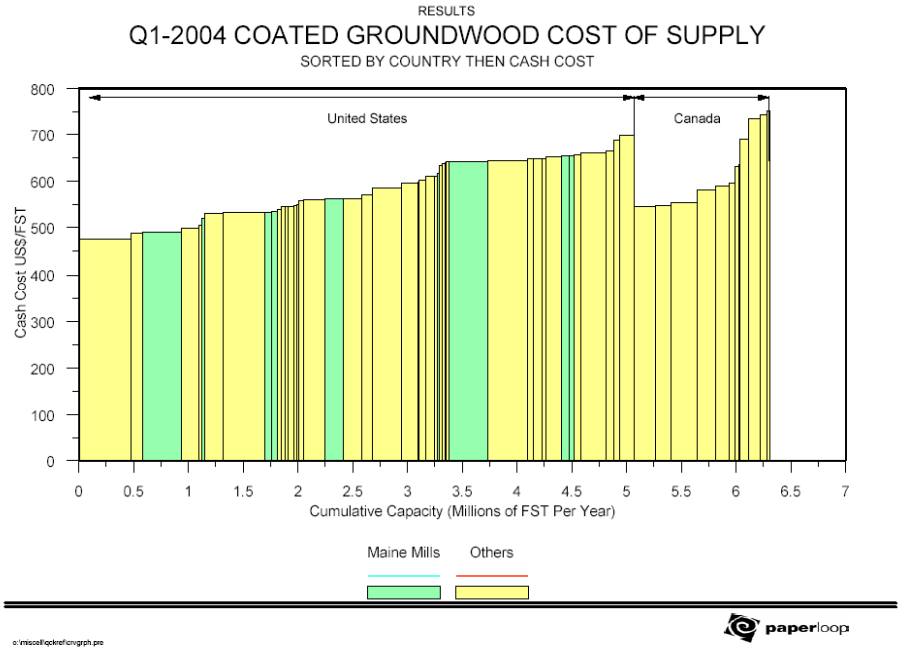
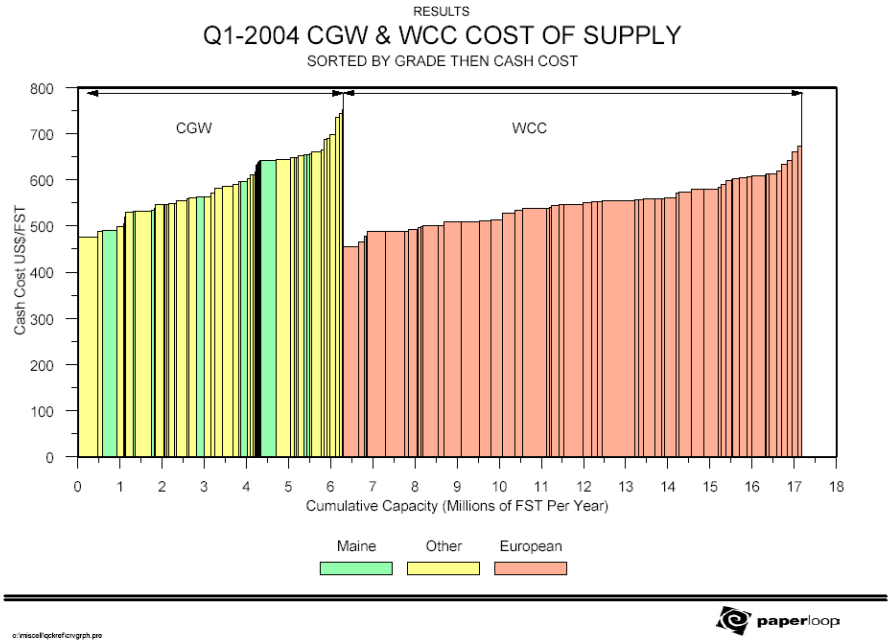
The following cost curves show the competitive position of Maine coated groundwood mills relative to their competitors. As is evident, some Maine mills (highlighted in green) are quite competitive when compared to both North American and global competitors; others are not[40].

Figure 34. North American Cost Curve, Coated Groundwood



[40] In a "cost curve", each column represents a single paper machine's capacity to produce a certain product (width represents millions of short tons per year). The height represents the "cash cost" or cost to produce a short ton of a specific grade. As prices rise and fall, it is expected that mills will continue, curtail, reduce or re-start operations based upon their ability to sell product at or above their cost of production.

Figure 35. Global Cost Curve, Coated Groundwood[41]



New global capacity in coated groundwood is being added. Between 2003 and 2005, a total of 950,000 tons of annual capacity (net) has or is anticipated to come on-line, almost six percent of existing worldwide capacity. For comparison, Maine's existing capacity in this grade is 1.3 million tons. Changes in capacity are anticipated at the following facilities:

Company	Mill	Capacity (annual net capacity in tons)[42]
Bowater	Catawba, SC	300,000
UPM	Grand Rapids	(156,000)
Stora Enso	Kimberly	(150,000)
Bowater	Catawba, SC	(136,000)
Kruger	Wayagamack	200,000
Stora Enso	Wisconsin Rapids	(69,000)
Leinfelder	Germany	300,000
Yeuyang	Hunan, China	125,000
Taishan	Shandong, China	136,000
Jiangxi	Jaingxi, China	400,000
Total CGW		950,000

[41] WCC is "wood containing coated" paper, a European grade that competes directly against coated groundwood.
[42] Parenthesis indicated anticipated capacity reductions.

These new mills are certain to be low-cost or least-cost producers, and will force some Maine mills higher up the cost curve.

Coated Freesheet

Coated freesheet (CFS) is a grade of paper that contains no ("free of") or little mechanical pulp or groundwood. Usually coated on two sides, this grade is used for high-end reports and brochures, catalogue covers, high-end magazines, direct mail and books. Maine's capacity of 1.3 million short tons of coated freesheet represents 22% of North American capacity. In Maine, coated freesheet is produced at the following mills:

Company	Town
International Paper	Jay
Mead Westvaco[43]	Rumford
SAPPI	Skowhegan

As shown in the following spreadsheet, the average Maine mill makes a short ton of coated freesheet for $532 per ton. This is less than the competing regions of Wisconsin, Quebec, the U.S. (average), Canada (average), Europe (WCC -- wood-containing coated) and Asia (ACP -- Asian commodity coated). However, it must be noted that there are wide variations in the cost by mill, and not all Maine mills are highly competitive on a global basis. In this grade, electrical costs are shown as low (or even negative). This is because a number of facilities self-generate power, but this must be viewed as a use of capital to mitigate Maine's relatively high electricity rates. If Maine mills lose their ability to generate and sell power economically, one would anticipate higher per-ton costs.

[43] On January 18, 2005 Mead Westvaco announced plans to sell its paper division, including the mill in Rumford, to the investor group Cerberus Capital Management L.P.

RESULTS

Q1-2004 CFS, WFC & ACP

TOTALS AND WEIGHTED AVERAGES

Mill				US$/FST							
						Energy		Labor			
Product	Region	FST/D	FST/Y	Fiber	Chemicals	Electrical	Fuel	Hourly	Salary	Materials	Cash Cost
Coated Freesheet	**Maine**	**3,421**	**1,221,297**								
Weighted Average				**148**	**137**	**4**	**50**	**87**	**35**	**70**	**532**
Minimum				**102**	**91**	**(7)**	**26**	**64**	**24**	**63**	**496**
Maximum				**286**	**172**	**53**	**62**	**167**	**69**	**81**	**757**
Coated Freesheet	**Wisconsin**	**2,775**	**990,675**								
Weighted Average				**217**	**133**	**16**	**66**	**94**	**20**	**66**	**612**
Minimum				**76**	**69**	**2**	**51**	**49**	**13**	**53**	**464**
Maximum				**418**	**184**	**33**	**92**	**125**	**38**	**80**	**848**
Coated Freesheet	**Qubec**	**376**	**134,232**								
Weighted Average				**310**	**160**	**6**	**84**	**109**	**35**	**75**	**781**
Minimum				**309**	**148**	**6**	**84**	**105**	**35**	**75**	**765**
Maximum				**311**	**166**	**6**	**85**	**112**	**35**	**76**	**789**
Coated Freesheet	**USA**	**14,800**	**5,283,689**								
Weighted Average				**176**	**137**	**13**	**55**	**96**	**35**	**71**	**582**
Minimum				**73**	**67**	**(7)**	**21**	**48**	**13**	**52**	**456**
Maximum				**418**	**212**	**53**	**92**	**169**	**86**	**102**	**945**
Coated Freesheet	**Canada**	**1,130**	**393,771**								
Weighted Average				**328**	**157**	**24**	**76**	**107**	**35**	**69**	**797**
Minimum				**288**	**88**	**6**	**67**	**89**	**29**	**55**	**765**
Maximum				**420**	**201**	**36**	**85**	**175**	**53**	**85**	**905**
Wood free Coated	**Europe**	**34,159**	**12,297,222**								
Weighted Average				**235**	**146**	**12**	**72**	**46**	**28**	**59**	**598**
Minimum				**102**	**101**	**(61)**	**40**	**23**	**13**	**48**	**480**
Maximum				**370**	**188**	**60**	**172**	**113**	**83**	**83**	**806**
Asian Coated Papers	**Asia**	**25,890**	**9,242,569**								
Weighted Average				**231**	**152**	**31**	**66**	**28**	**15**	**44**	**557**
Minimum				**99**	**124**	**(26)**	**18**	**6**	**7**	**35**	**431**
Maximum				**351**	**193**	**111**	**121**	**62**	**29**	**60**	**684**

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Note: the above data is based on the mills in Paperloop Benchmarking Services database.

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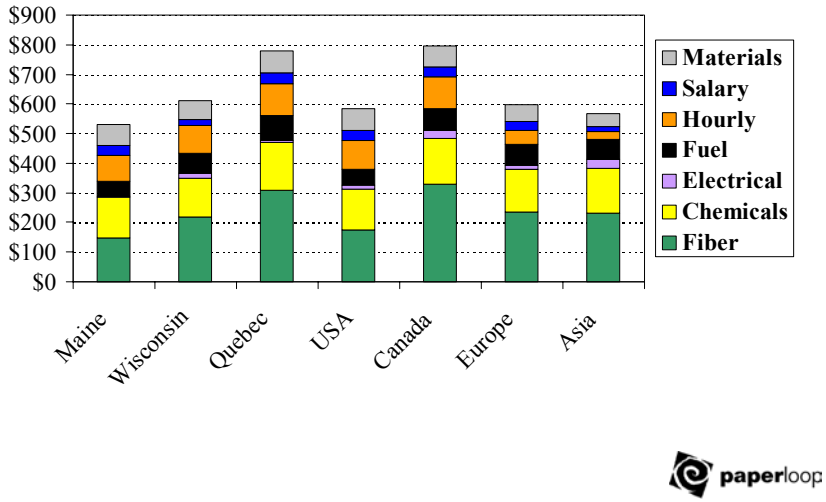
The information presented above is provided again in graphic form, which shows Maine's average production of coated freesheet is competitive with other regions of the world.

Figure 36. Weighted Average Cash Cost/Short Ton, Coated Freesheet, Q1 2004



The following cost curves show the competitive position of Maine coated freesheet mills relative to their competitors. As is evident, some Maine mills (highlighted in green) are among the least-cost producers when compared to both North American and global competitors.

Figure 37. North American Cost Curve, Coated Freesheet

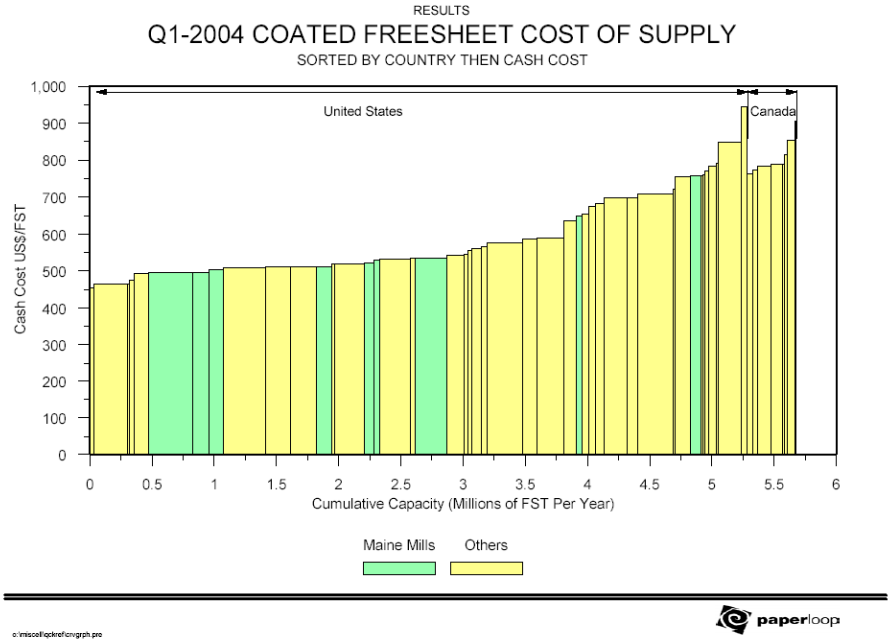
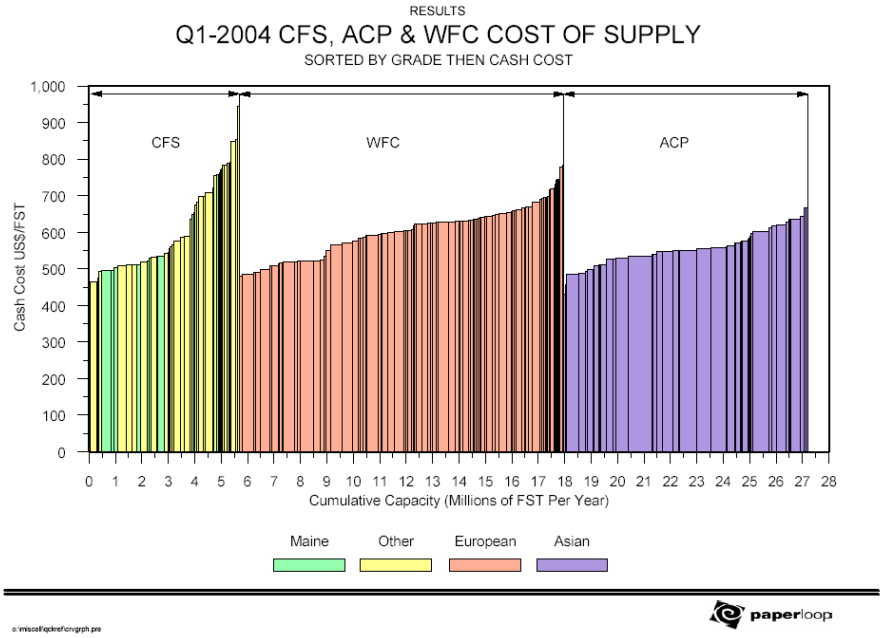


Figure 38. Global Cost Curve, Coated Freesheet[44]



New global capacity in coated freesheet is being added. In 2005 and 2006, a total of 2.6 million tons of annual capacity (net) is anticipated to come on-line, roughly a 10% increase in global capacity. In comparison, Maine's existing capacity in this grade is 1.3 million tons. Changes in capacity are anticipated at the following facilities:

Company	Mill	Capacity (annual net capacity in tons)
Bowater	Catawba	100,000
Lecta	Condat, France	120,000
Stora Enso	Kimberly	186,000
Appleton	C. Locks	113,000
Burgo	Belgium	600,000
APP	Jiangsu, China	700,000
UPM	Jiangsu, China	200,000
Oji	Jiangsu, China	600,000
Total CFS		2,619,000

[44] ACP is "Asian commodity coated" and WFC is "wood free coated", both grades that compete directly against coated freesheet.

Uncoated Freesheet

Uncoated freesheet (UCFS) is a grade of paper that contains no ("free of") or little mechanical pulp or groundwood. It generally refers to white, uncoated paper made from kraft pulp. The chemical (kraft) pulping process produces bright, strong papers that are widely used in business (copier paper), as well as commercial printing and envelopes. Maine's capacity of 0.4 million short tons of coated groundwood represents 3% of North American capacity. In Maine, uncoated freesheet is produced at the following mills:

Company	Town
International Paper	Jay
Fraser	Madawaska
Domtar	Woodland

As shown in the following spreadsheet, the average Maine mill makes a short ton of uncoated freesheet for $654 per ton. This is more than the competing regions of Quebec, the U.S. (average), Canada (average), Europe and Asia. Of the regions reviewed, only Wisconsin has higher average cost than Maine. Areas where Maine mills are noticeably higher cost than competing regions include electricity, labor (both hourly and salaried), and maintenance.

RESULTS

Q1-2004 UCFS & WFU

TOTALS AND WEIGHTED AVERAGES

Mill		Capacity		US$/FST							
						Energy		Labor			
Product	Region	FST/D	FST/Y	Fiber	Chemicals	Electrical	Fuel	Hourly	Salary	Materials	Cash Cost
Uncoated Freesheet	Maine	1,716	612,612								
Weighted Average				236	97	37	54	118	43	71	654
Minimum				129	45	(0)	30	61	20	52	467
Maximum				485	130	67	85	150	76	81	931
Uncoated Freesheet	Wisconsin	4,320	1,542,647								
Weighted Average				306	99	26	62	112	43	65	713
Minimum				166	31	(0)	24	51	18	50	540
Maximum				539	158	42	95	193	100	84	966
Uncoated Freesheet	Qubec	2,202	786,114								
Weighted Average				240	87	19	58	78	26	55	563
Minimum				176	57	6	50	61	22	52	468
Maximum				421	119	23	77	152	40	61	856
Uncoated Freesheet	USA	40,799	14,565,650								
Weighted Average				180	90	13	53	81	32	60	510
Minimum				110	31	(19)	24	29	11	43	344
Maximum				539	158	67	105	207	120	93	966
Uncoated Freesheet	Canada	4,752	1,696,542								
Weighted Average				210	93	18	55	79	27	56	538
Minimum				100	57	6	41	45	17	52	406
Maximum				454	146	38	81	155	56	70	856
Woodfree uncoated	Europe	19,618	7,003,449								
Weighted Average				208	99	7	51	38	23	46	471
Minimum				75	63	23	19	22	12	37	305
Maximum				410	132	35	112	78	46	60	701
Woodfree uncoated	ASIA	16,310	5,822,500								
Weighted Average				269	71	16	37	18	11	45	468
Minimum				133	49	(39)	14	5	3	32	292
Maximum				419	88	76	90	56	29	53	631

O:\Projects\Innovative Natural Resources Solutions\[Region & World region Data.xls]UCFS & WFC

Note: the above data is based on Paperloop Benchmarking Services database.

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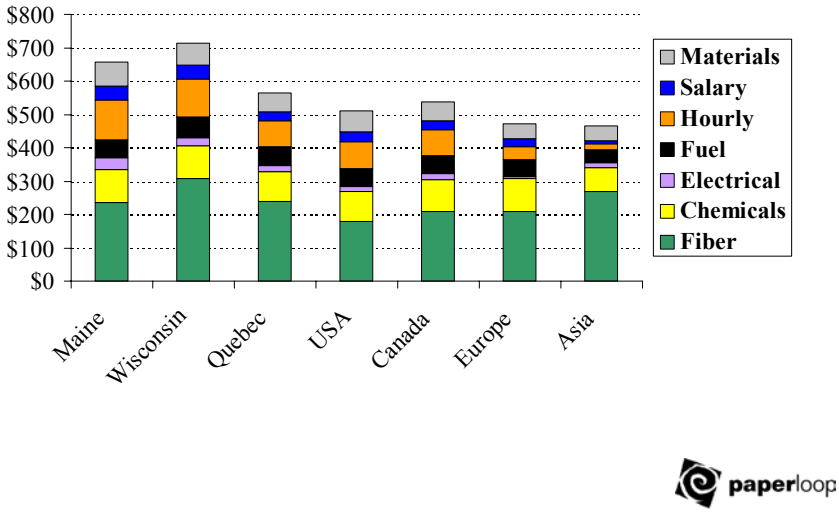
The information presented above is provided again in graphic form, which shows Maine's average production of uncoated freesheet is higher cost than other regions of the world.

Figure 39. Weighted Average Cash Cost/Short Ton, Uncoated Freesheet, Q1 2004



The following cost curves show the competitive position of Maine coated freesheet mills relative to their competitors. As is evident, Maine mills (highlighted in green) are relatively high cost mills in both North America and globally.

Figure 40. North American Cost Curve, Uncoated Freesheet

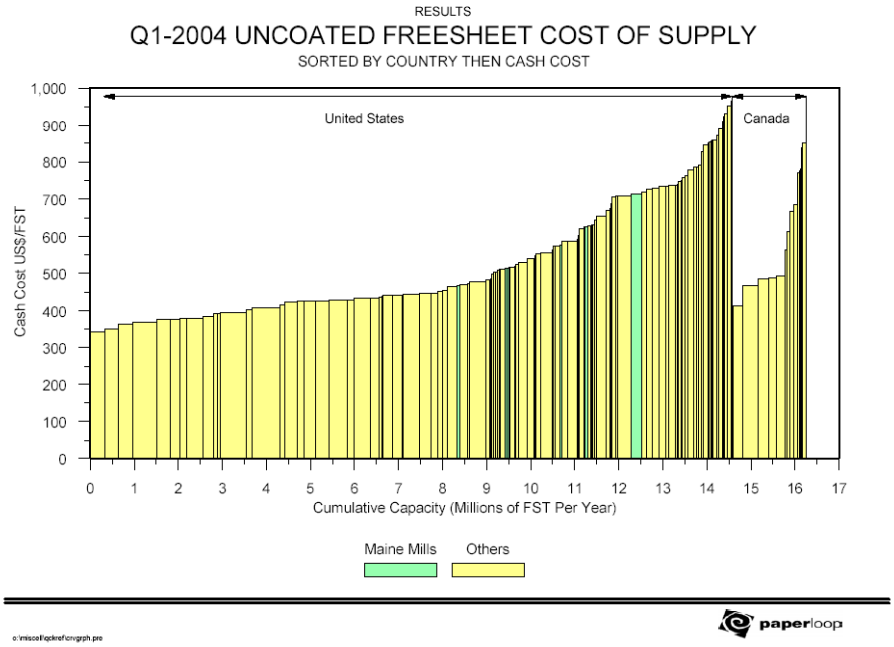
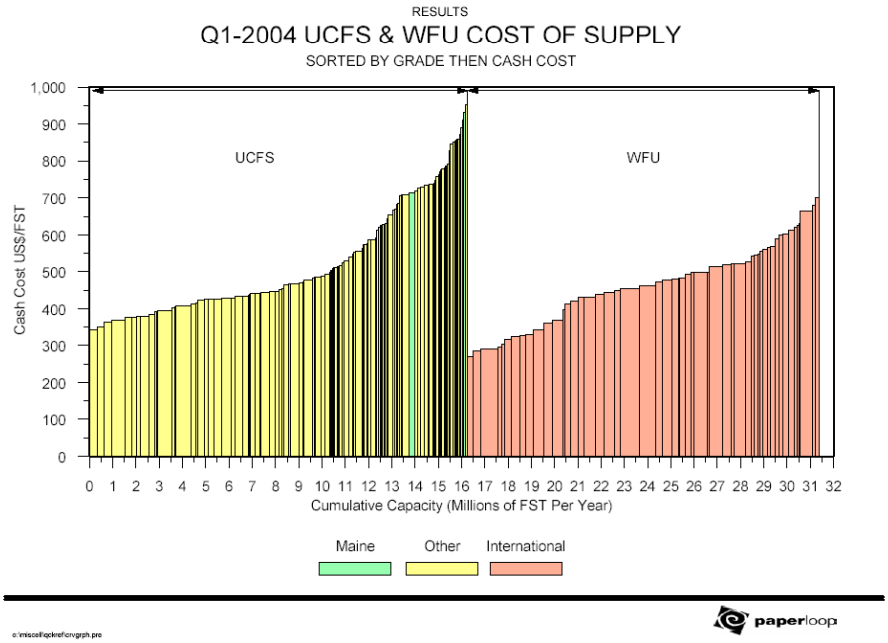


Figure 41. Global Cost Curve, Uncoated Freesheet[45]



New global capacity in uncoated freesheet is being added. From 2003 and 2006, a total of 1.9 million tons of annual capacity (net) has or is anticipated to come on-line, roughly a 6% increase in global capacity. For comparison, Maine's existing capacity in this grade is 0.4 million tons. All of the new capacity investments are offshore. Changes in capacity are anticipated at the following facilities:

Company	Mill	Capacity **(annual net capacity in tons)**
Stora	Vietsiluto, Finland	115,000
Sun Paper	Shandong, China	160,000
April	Indonesia	450,000
UPM	Jiangsu, China	250,000
Portucel	Portugal	500,000
RGM	Guangdong, China	450,000
Total UCFS		1,925,000

[45] WFU is "wood free uncoated", a grade that competes directly against uncoated freesheet.

Directory

Directory is a grade of uncoated groundwood paper, similar to newsprint but with higher brightness. In Maine, directory is produced at the following mills:

Company	Town
Fraser	Madawaska
Katahdin Paper	East Millinocket

As shown in the following spreadsheet, the average Maine mill makes a short ton of directory for $449 per ton. This is greater than all competing regions analyzed -- Quebec, the U.S. (average), Canada (average), Europe and Asia.

RESULTS

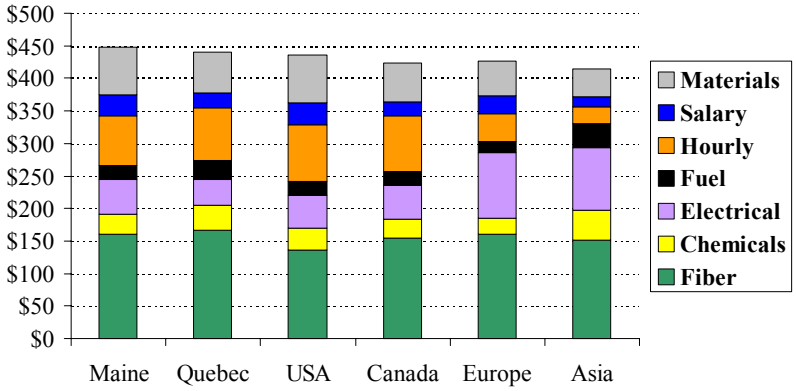
Q1-2004 DIRECTORY

TOTALS AND WEIGHTED AVERAGES

Mill		Capacity		US$/FST							
						Energy		Labor			
Product	Region	FST/D	FST/Y	Fiber	Chemicals	Electrical	Fuel	Hourly	Salary	Materials	Cash Cost
Directory	Maine	635	228,571								
Weighted Average				161	30	53	22	77	31	74	449
Minimum				156	29	47	18	75	24	69	439
Maximum				188	30	81	23	89	33	75	498
Directory	Wisconsin										
Weighted Average											
Minimum											
Maximum											
Directory	Qubec	998	359,127								
Weighted Average				167	38	40	29	81	23	63	441
Minimum				116	20	34	21	65	19	57	382
Maximum				273	52	51	41	95	27	66	518
Directory	USA	1,098	395,238								
Weighted Average				136	34	50	21	87	35	73	436
Minimum				101	29	47	18	75	24	68	417
Maximum				188	39	81	24	100	41	69	438
Directory	Canada	2,116	761,905								
Weighted Average				155	28	52	22	85	22	59	423
Minimum				108	17	34	16	65	17	49	358
Maximum				273	52	73	41	101	27	70	518
Directory	Europe	1,824	656,250								
Weighted Average				160	25	101	17	43	27	53	427
Minimum				130	15	5	6	26	17	44	349
Maximum				240	76	148	80	75	47	79	584
Wood containing Coated	ASIA	226	81,349								
Weighted Average				152	45	96	37	26	15	44	414
Minimum				110	38	29	9	8	6	39	382
Maximum				199	50	151	53	43	27	49	467

This information is presented again in graphic form, which again shows that Maine is high-cost when compared to other regions for this grade.

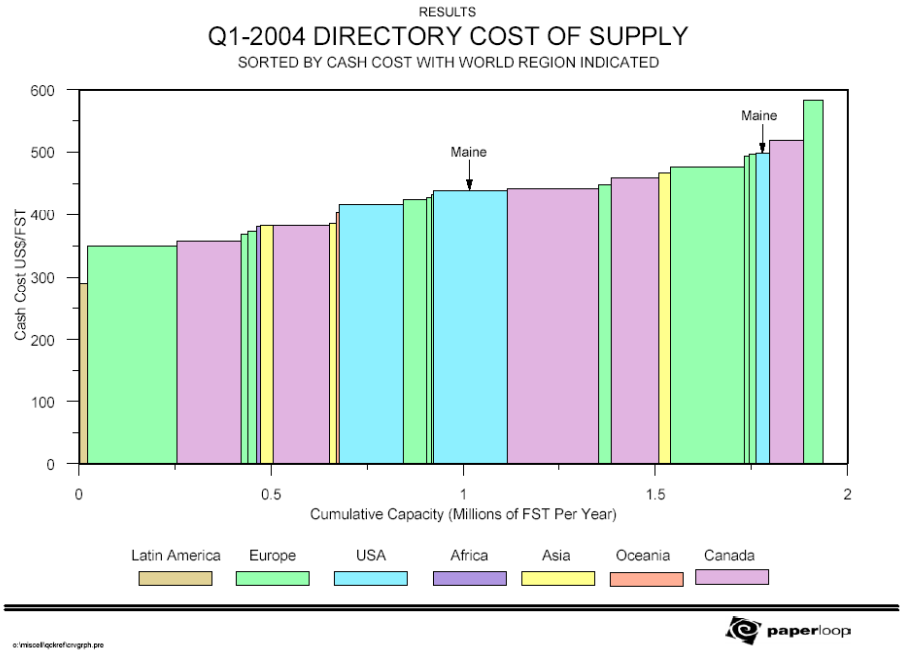
Figure 42. Weighted Average Cash Cost/Short Ton, Directory, Q1 2004



paperloop

The following cost curve shows the competitive position of Maine directory mills relative to their competitors. Due to the comparatively flat nature of the cost curve for this grade, most changes in the cost of producing these grades in Maine could do a great deal to improve the future of these facilities.

Figure 43. Global Cost Curve, Directory



Supercalendared

Supercalendared (SC) is a grade of uncoated groundwood that has high smoothness and brightness when compared with other groundwood, and often competes with some coated papers in magazine and catalogue markets. In Maine, supercalendared is produced at the following mills:

Company	Town
Katahdin Paper	Millinocket
Madison Paper	Madison

As shown in the following spreadsheet, the average Maine mill makes a short ton of supercalendared for $487 per ton. This is less than the competing regions of Minnesota, Quebec, Canada (average). However, it is above the U.S. average.

RESULTS

Q1-2004 SUPERCALENDERED

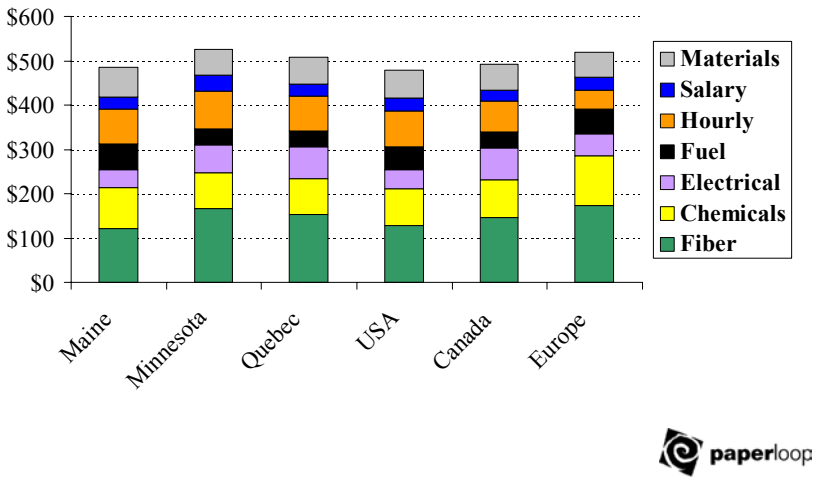
TOTALS AND WEIGHTED AVERAGES

Mill		Capacity		US$/FST							
						Energy		Labor			
Product	Region	FST/D	FST/Y	Fiber	Chemicals	Electrical	Fuel	Hourly	Salary	Materials	Cash Cost
Supercalandered	**Maine**	**1,132**	**407,438**								
Weighted Average				**122**	**91**	**42**	**57**	**78**	**29**	**67**	**487**
Minimum				**84**	**89**	**31**	**49**	**73**	**25**	**64**	**480**
Maximum				**153**	**99**	**57**	**66**	**85**	**33**	**70**	**492**
Supercalandered	**Minnesota**	**968**	**348,448**								
Weighted Average				**166**	**82**	**62**	**35**	**86**	**37**	**57**	**525**
Minimum				**152**	**69**	**50**	**26**	**57**	**24**	**56**	**480**
Maximum				**176**	**94**	**87**	**39**	**151**	**65**	**60**	**619**
Supercalandered	**Qubec**	**2,845**	**1,024,206**								
Weighted Average				**152**	**81**	**73**	**36**	**78**	**27**	**61**	**507**
Minimum				**127**	**62**	**6**	**27**	**62**	**19**	**53**	**483**
Maximum				**174**	**96**	**113**	**47**	**106**	**49**	**67**	**532**
Supercalandered	**USA**	**2,865**	**1,031,283**								
Weighted Average				**127**	**84**	**44**	**50**	**81**	**30**	**63**	**480**
Minimum				**84**	**61**	**21**	**26**	**57**	**22**	**56**	**411**
Maximum				**176**	**99**	**87**	**66**	**151**	**65**	**70**	**619**
Supercalandered	**Canada**	**6,521**	**2,347,619**								
Weighted Average				**145**	**87**	**72**	**35**	**71**	**23**	**60**	**492**
Minimum				**66**	**62**	**6**	**16**	**46**	**15**	**48**	**427**
Maximum				**189**	**122**	**113**	**62**	**113**	**49**	**78**	**587**
Supercalandered	**Europe**	**14,547**	**5,236,905**								
Weighted Average				**172**	**114**	**49**	**55**	**43**	**29**	**57**	**518**
Minimum				**110**	**90**	**3**	**19**	**27**	**17**	**44**	**422**
Maximum				**206**	**127**	**120**	**123**	**79**	**56**	**70**	**589**
Supercalandered	**ASIA**										
Weighted Average											
Minimum											
Maximum											

Q:\Projects\Innovative Natural Resources Solutions\[Region & World region Data.xls]Supercalendered

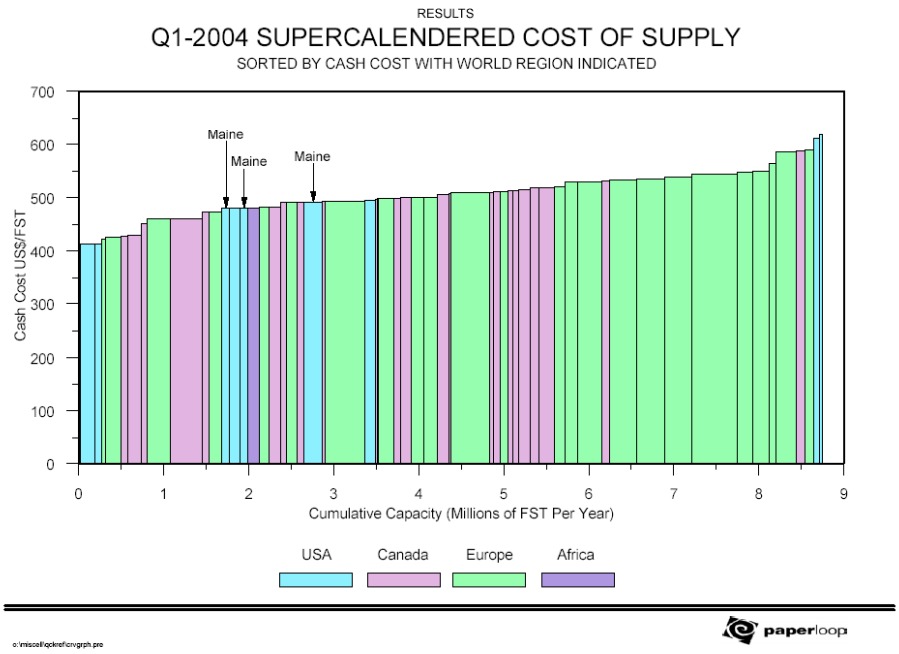
The same information, presented in graphic form, shows that Maine is globally competitive in the supercalender grade.

Figure 44. Weighted Average Cash Cost/Short Ton, Supercalender, Q1 2004



Maine mills are lower-cost in this grade when compared to global competitors. However, given the relatively flat nature of this cost curve, modest changes in other regions could quickly change this.

Figure 45. Global Cost Curve, Supercalendered



Other products

Maine mills also produce and sell tissue, specialty papers, bleached hardwood kraft pulp and bleached softwood kraft pulp. Due to restrictions on either data availability (not enough facilities in the Maine sample size to provide anonymity) or budget, INRS did not purchase cost curves for these products.

However, cost curves for both hardwood and softwood pulp were presented at a 2003 meeting in Bangor[46]. In the information presented at this meeting (using data from the 4th Quarter of 2002), production costs for Maine softwood kraft (BSKP) was about $40 per ton above the industry average, and $80 per ton above the industry average for bleached hardwood kraft (BHKP).

Tissue production capacity in Maine is 0.1 million tons per year, roughly 1% of North American capacity. Produced at mills in Lincoln and Old Town, tissue is a stable market that grows at about 2% annually. Because production and distribution tend to be very regional, industry analysts believe that Maine's tissue industry is limited by a lack of population growth in New England.[47]

Outlook

Maine pulp and paper mills operate in a very difficult industry, where returns on investment have been below the cost of capital for over a decade. Within this environment, Maine mills have done an exceptional job of maintaining operations with older, less efficient machines.

The overall outlook for Maine's paper industry is mixed. Changes in the historic exchange rate with Europe and Canada give Maine mills (and U.S. mills in general) a short-term advantage in the marketplace. This exchange rate change, coupled with a general economic recovery in the nation and the world, provides an opportunity for many Maine mills to increase mill profitability, secure relationships with customers and penetrate new markets.

However, this opportunity is expected to be short-lived. Once exchange rates turn again to favor imports, and once overall economic activity slows, Maine mills will again enter a very difficult period, during which some mills will experience closings, either temporary or permanent. The opportunity to avoid this is now; Maine mills have a window of opportunity in which they can make capital investments to better position themselves in the global marketplace. These investments will vary from mill to mill, but must be designed to improve a mill's value and overall competitive position.

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[46] McNutt, James. *Maine's Competitive Position in the Pulp & Paper Industry – A Competitive Assessment.* April 4, 2003.

[47] Maine, John. RISI Vice President. *Outlook for Maine's Paper Industry.* Presentation to the Maine Pulp & Paper Association. January 2005.

Investments in Maine paper mills may result in increased capacity (increased output), or – more likely – efficiency improvements that allow a facility to cut input costs while producing the same volume of paper. Additionally, capital could be employed to develop new value-added products that do not interfere with (or even enhance) the paper making process or reconfigure a machine to produce a more competitive grade.

Maine mills compete for capital, and investments must be sound business decisions. While addressed in detail elsewhere, the business climate and tax structure of Maine can be improved to encourage investment in Maine facilities, and the speedy deployment of technology once investment decisions are made. Similarly, Maine mills and government must work together not only to address areas that contribute to high costs in some mills, but also to secure the long-term advantages that Maine paper mills have long enjoyed.

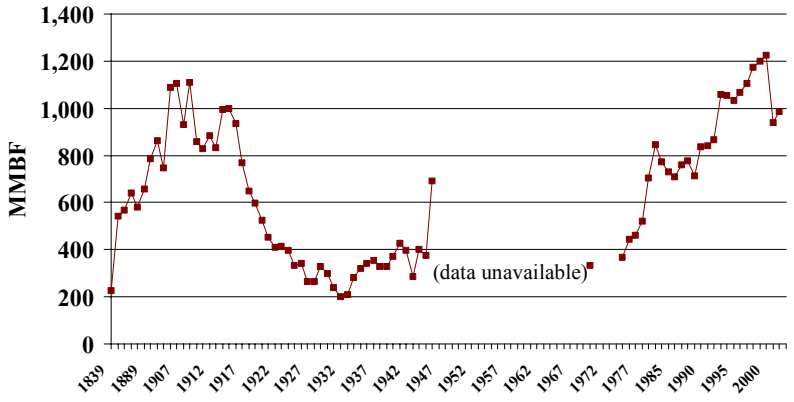
Without new investments, Maine can expect with certainty to lose paper mills and machines in the coming years. As new machines come on-line elsewhere in the world, Maine mills will become less competitive when compared to others. While the situation varies from mill to mill, it is anticipated that failure to attract new capital to aging mills will mean that facilities are operated with declining profitability, and eventually close. Maine has abundant forest resources, a highly skilled papermaking workforce, and the infrastructure to support pulp and paper manufacturing. However, these advantages will not be enough to support Maine mills in future years, and must be built upon if the industry is to remain competitive in this state.

Sawmills and Wood Product Manufacturing

Industry Overview

Maine's sawmills are a critical piece of the state's forest industry, and are located in all regions of the state. Maine has a long history of lumber production; at one point in the early 1900's, thousands of small mills produced as much lumber as is sawn in Maine today. In the era following World War I, lumber production declined. Maine sawmills, both hardwood and softwood, have seen significant increases in production over the past three decades. This trend represents real growth in Maine's forest industry. Maine sawmill production levels have decreased since a peak in 2000 – the bulk of this can be attributed to the closing of two large softwood mills. Anecdotal evidence suggests that production may have rebounded in 2004.

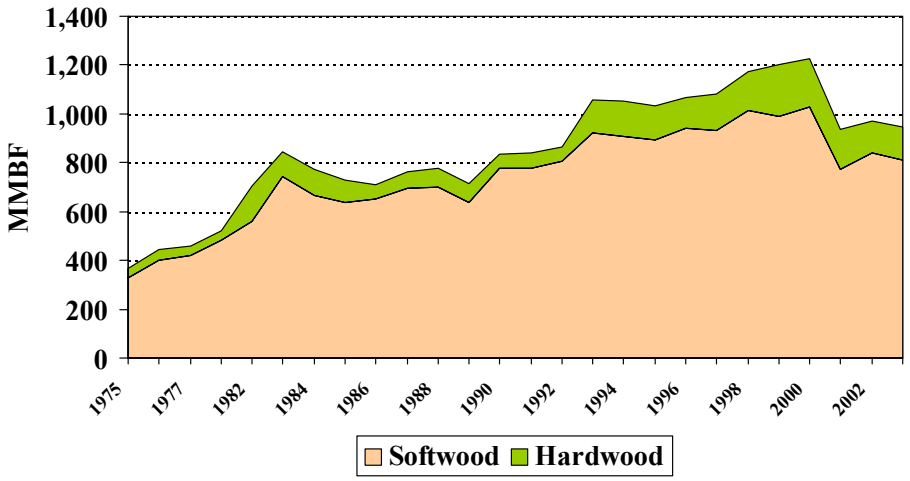
Figure 46. Maine Lumber Production, 1839 - 2002



Data Source: U.S. Department of Commerce, Census Division

Over eighty percent of Maine's lumber production is softwood – structural lumber from spruce and fir and white pine for pine boards. Maine mills have increased production by 250% since 1975. By volume, most of this increase has been in softwood lumber, but hardwood lumber production has increased by over 400% during this same time period.

Figure 47. Maine Lumber Production, 1975 - 2002



Data Source: U.S. Department of Commerce, Census Division

According to data from the U.S. Commerce Department, Census Division, Maine sawmills have seen a decline in the number of employees, payroll and value of shipments in recent years[48].

	1997	2002
Number of Employees	2,369	1,786
Payroll	$69,228,000	$51,291,000
Value of Shipments	$427,044,000	$297,453,000

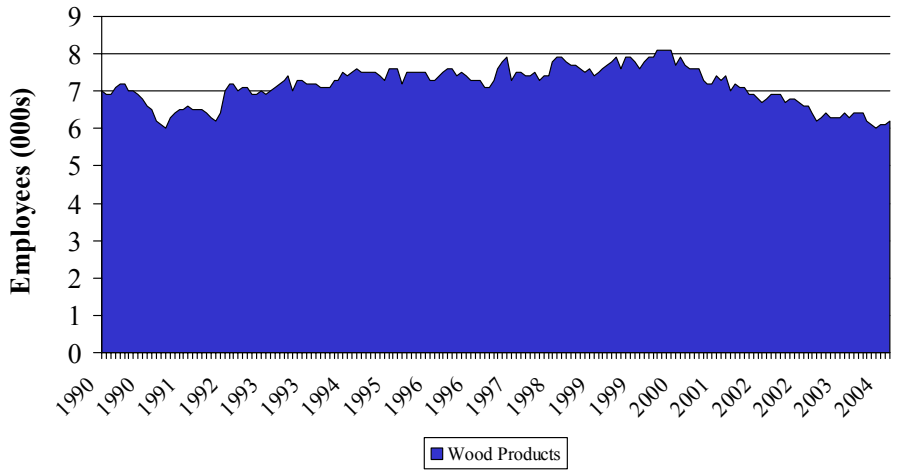
Interestingly, combining this employment information with the production data shows that Maine mills have become noticeably more productive per employee, increasing annual output per employee from 466 MBF per employee in 1997 to 525 MBF per employee in 2002. This represents a 13% increase in just five years, and is likely the net effect of capital investments made during the late 1990's.

[48] NAICS code 3211, sawmills and wood preservation

While capital investment may lead to loss of some jobs, it is a key component of the future success of Maine's sawmill sector[49]. Maine has comparatively high electricity and labor costs, and one way that mills can control these costs is through the use of technology. In order for Maine mills to be competitive in the global marketplace, mills will need to use technology to control costs and be as efficient and productive as possible.

Maine's solid wood sector generally, which includes both sawmills and wood product manufacturers[50], has shown employment levels between 6,000 and 8,000 over the past decade, with a loss of nearly 2,000 jobs since a peak in the spring of 2000.

Figure 48. Maine Wood Products Manufacturing Employment, 1990 - 2004

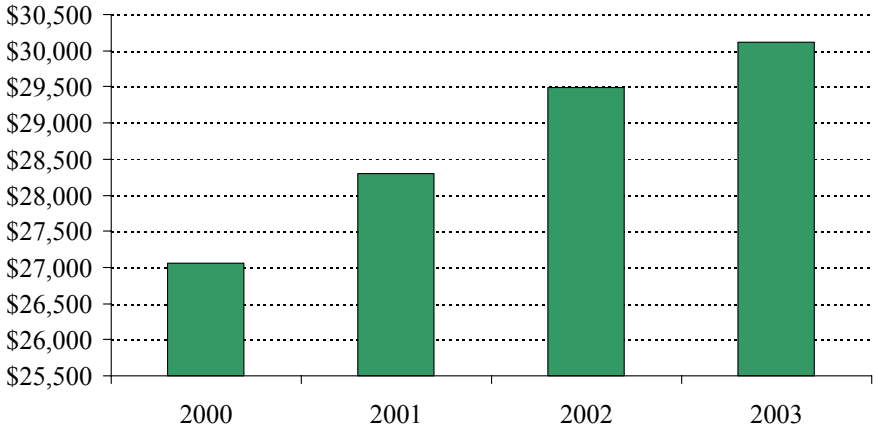


Data Source: US Department of Labor

[49] It should be noted that capital investment in technology can lead to increased output with lower per-unit costs, new product lines, or more efficient production at existing levels.
[50] NAICS Code 321

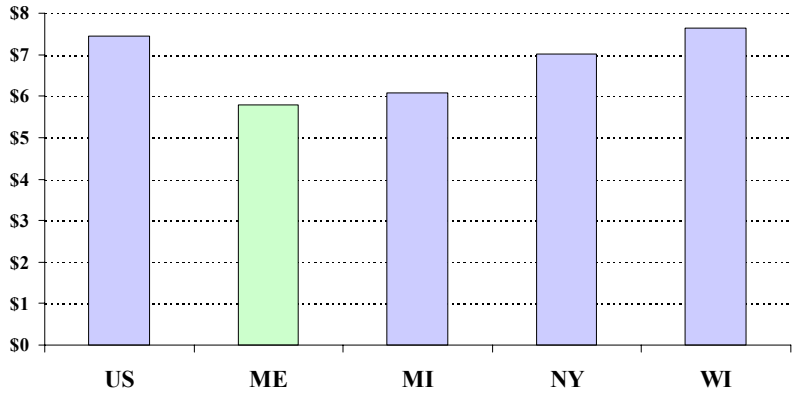
While there has been a loss of jobs, wages for retained positions in the wood products manufacturing industry have risen steadily, with the average wage rising from $27,054 in 2000 to $30,121 in 2003.

Figure 49. Average Annual Wage, Maine Wood Products Manufacturing



According to information from the U.S. Census Bureau, Maine sawmills ship $5.80 for every dollar of payroll, slightly lower than what other states with a similar forest type ship.

Figure 50. Value of Shipments Per Dollar of Payroll, Sawmills, 2001[51].

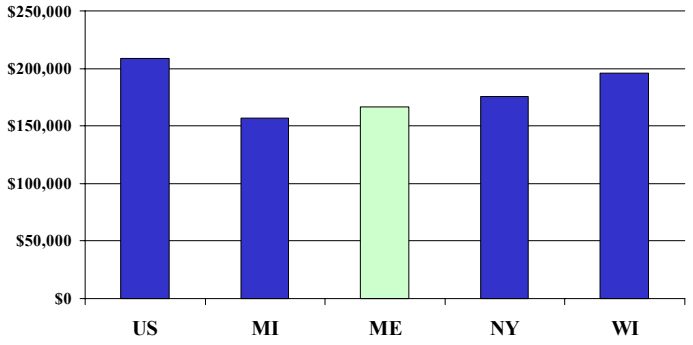


Data Source: United States Census of Manufacturing, 2001

[51] Information on New Hampshire, Vermont, and Minnesota is unavailable.

When viewed as value of shipments per employee, Maine is comparable with other states with a similar forest type. In 2001, Maine sawmills shipped $166,547 of product for each employee. The difference in Maine's position when measured as a function of payroll and as a function of employees is most likely related to Maine's higher labor costs, particularly benefits.

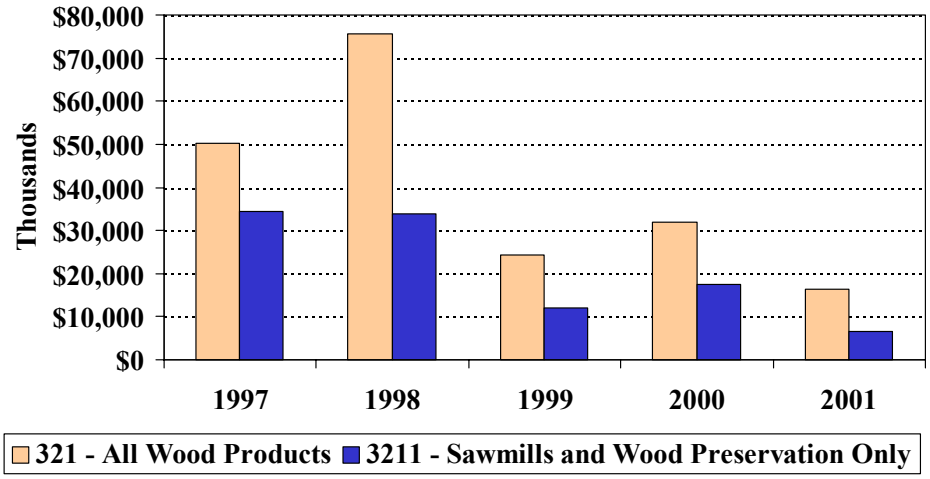
Figure 51. Value of Shipments Per Employee, Sawmills, 2001



Data Source: United States Census of Manufacturing, 2001

Maine sawmills and wood product manufacturers have been making investments in their facilities, with investment levels largely following economic conditions in the nation.

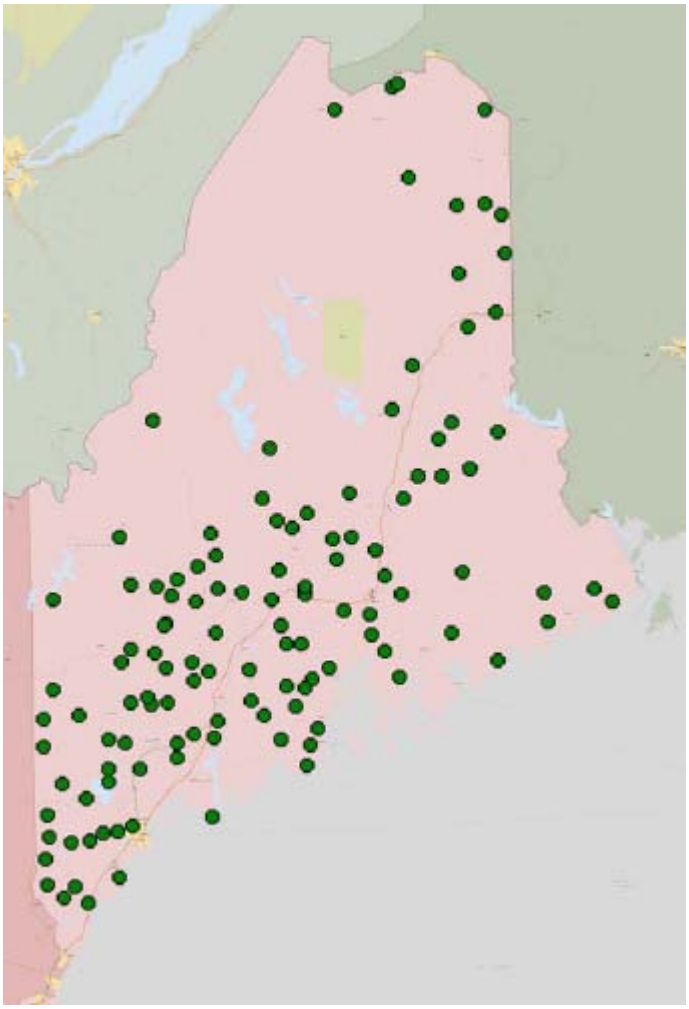
Figure 52. Capital Investments in Maine Wood Product Manufacturing Facilities, 1997 – 2001



Data: U.S. Census of Manufacturers

Maine sawmills are located throughout the state (including a concentration in Southern Maine), and are a critical economic component of many rural communities. The following map shows the location of existing Maine sawmills.

Figure 53. Geographic Distribution of Maine Sawmills[52]

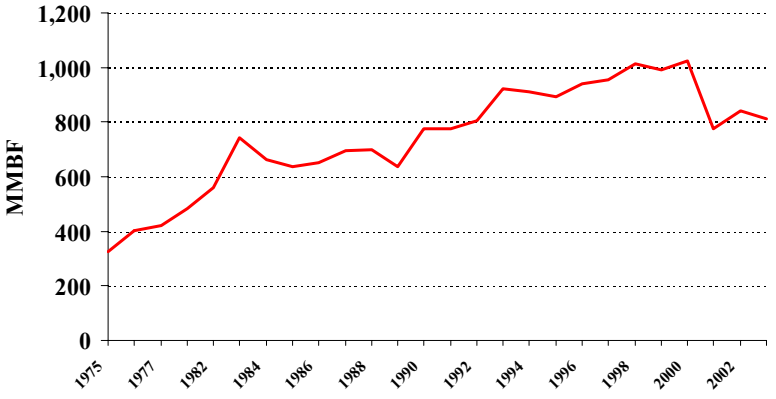


[52] Data Source: Maine Forest Service, Department of Conservation. This map shows all mills with production greater than or equal to 10 thousand board feet of production per year. Placements on map are generally in the center of the Zip Code, so may not perfectly reflect the location of a facility.

Softwood Lumber

Softwood lumber is the bulk of Maine's lumber production by volume, and has enjoyed significant increases in volume in the past three decades. Softwood lumber production has grown from 326 MMBF in 1975 to a peak of 1,026 MMBF in 2000. Production has dropped to 813 MMBF in 2003; much of this can be accounted for through the closing of two large mills.

Figure 54. Maine Softwood Lumber Production, 1975 - 2002



Data Source: U.S. Department of Commerce, Census Division

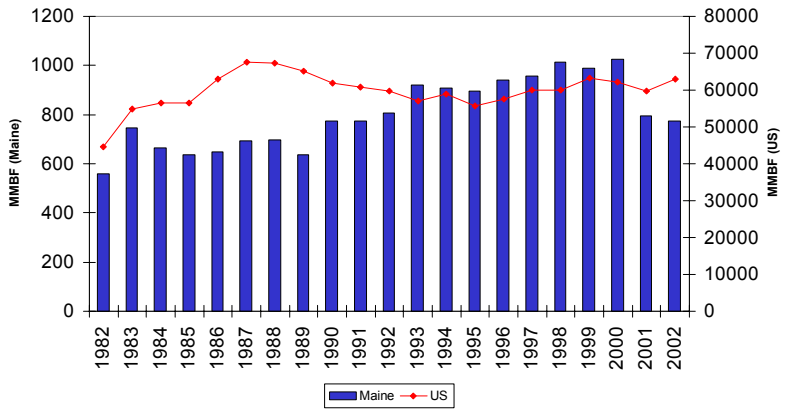
Maine's softwood lumber production is primarily two products: structural lumber from spruce and fir, and white pine lumber. Structural lumber is the traditional "2x" lumber used in home construction, and competes directly against structural lumber from other parts of the U.S., Canada and offshore sources. White pine lumber is used to make boards, sheathing, siding, furniture, millwork, crates, and toys, among other products.

Softwood lumber, particularly structural lumber, is largely sold as a commodity. The largest market for softwood structural lumber is the U.S. housing market, as structural lumber is highly preferred in residential construction (particularly single-family residential construction). When sold in traditional lengths, structural lumber is a very difficult product to differentiate, and to date there has not been significant consumer demand for differentiated (e.g., certified wood or "American made")[53] structural lumber. If a large market for differentiated wood products develops, it may impact consumer-ready markets such as flooring and furniture before structural lumber.

[53] Personal communication with Dr. Henry Spelter, USDA Forest Products Laboratory, March 17, 2004

Maine softwood lumber production has generally followed U.S. softwood lumber production through 2000. At that point, U.S. softwood lumber production remained relatively flat, while Maine production made a noticeable decline.

Figure 55 . Maine and U.S. Softwood Lumber Production, 1982 - 2002



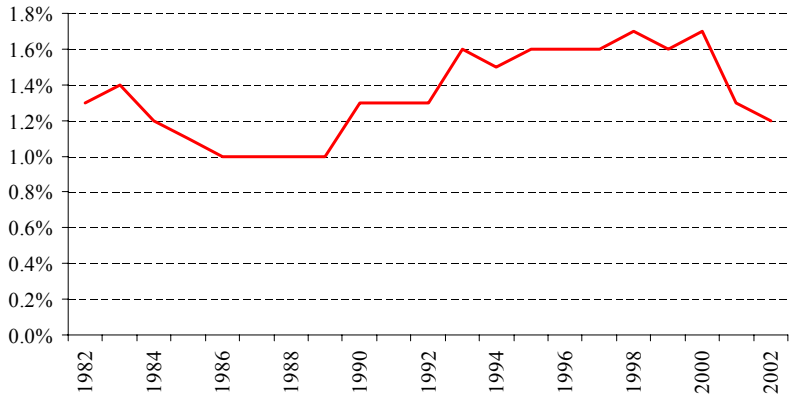
Data Source: USDA Forest Products Laboratory and U.S. Census Division

Nationwide, 2004 was a record year for lumber use, with 59.7 billion board feet, an increase of 4.8% over 2003. This was the sixth time in the last eight years that national lumber consumption set a new record. This was led by a strong housing market, which used an all-time high of 25.6 billion board feet of lumber in residential construction. With interest rates expected to rise, lumber use is forecast to drop by 4.2% for 2005. At 57.2 billion board feet, this would still be the second strongest year in history for U.S. lumber consumption.[54]

[54] Shell, Dan. "Lumber Demand May Dip in 2005." *Timber Processing Magazine.* January / February 2005.

Maine is home to three of the nation's "Top 200" softwood sawmills[55] (as measured by production), with another company recently announcing plans to develop a new facility in Maine that would be in the nation's top 30, as measured by MMBF production[56]. While softwood lumber production is critical to Maine's forest economy, it is a relatively small percentage of U.S. softwood lumber production. Maine's share of U.S. production grew steadily during the 1990's, from 1.0% of U.S. production in 1989 to 1.7% in 2000. That has since fallen to 1.2% in 2002; reflecting Maine's softwood lumber production decline while U.S. production remained relatively flat.

Figure 56. Maine Softwood Lumber as a Percentage of U.S. Production



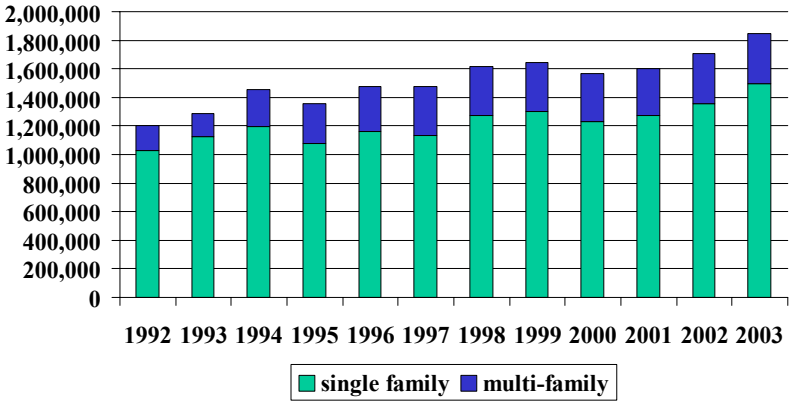
Data Source: USDA Forest Products Laboratory and U.S. Census Division

Across the country, 2.4 billion board feet of new lumber capacity is expected in 2004 – 2005. This increase represents about 3.3% of U.S. consumption.[57]

[55] Donnell, Rich. "Top 200 U.S. Softwood Sawmills". *Timber Processing Magazine*. July / August 2004.
[56] "Proposed Mill Takes Next Step". *Timber Processing Magazine*. July / August 2004.
[57] Spelter, Henry. "Good Vital Signs." *Timber Processing Magazine.* January / February 2005.

In the U.S., the best and most often used indicator of demand for softwood lumber is housing starts. Since 1992, U.S. housing starts have climbed steadily, from 1.2 million starts in 1992 to over 1.8 million starts in 2003. This has led to a steady increase in market for softwood lumber, particularly from North American lumber.

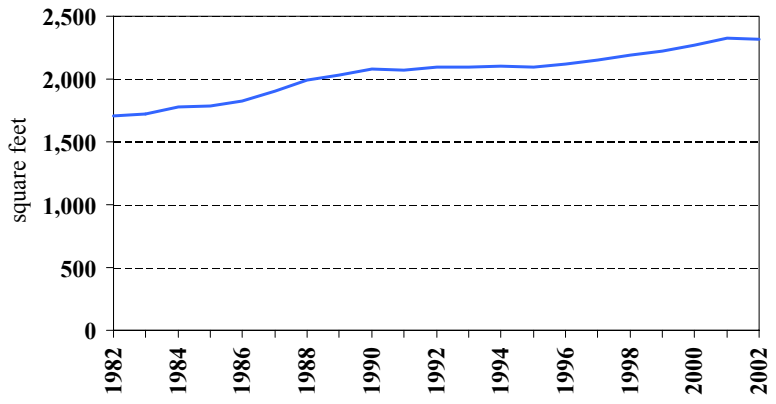
Figure 57. U.S. Housing Starts, 1992 - 2003



Source: U.S. Census Bureau

The size of the average new U.S. house has steadily increased; meaning more wood and wood products are consumed in construction of each housing unit. In 1982 the average housing start was 1,710 square feet; this had grown by a third to 2,320 square feet in 2002.

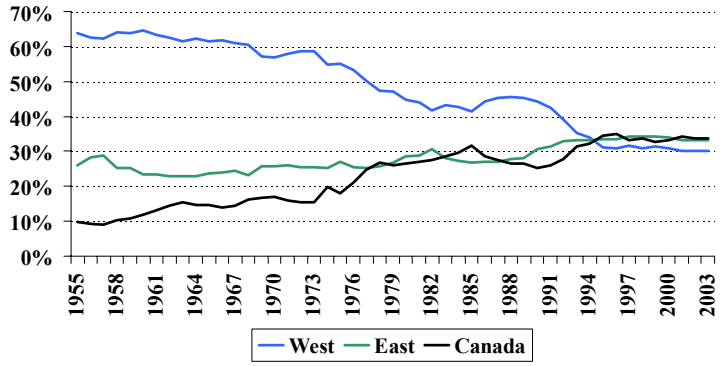
Figure 58. Average Floor Area (Feet^2) of New U.S. Housing Unit (Single Family)



Data Source: USDA Forest Products Laboratory

North American lumber has long dominated the U.S. structural lumber markets, and the market share enjoyed by Eastern U.S. production (a region that includes Maine) has grown from 26% of the structural market in 1955 to 33% today. This increase has come largely at the cost of Western U.S. producers, many of whom have seen drastically reduced raw material availability as the result of decreases in timber harvesting on public lands.

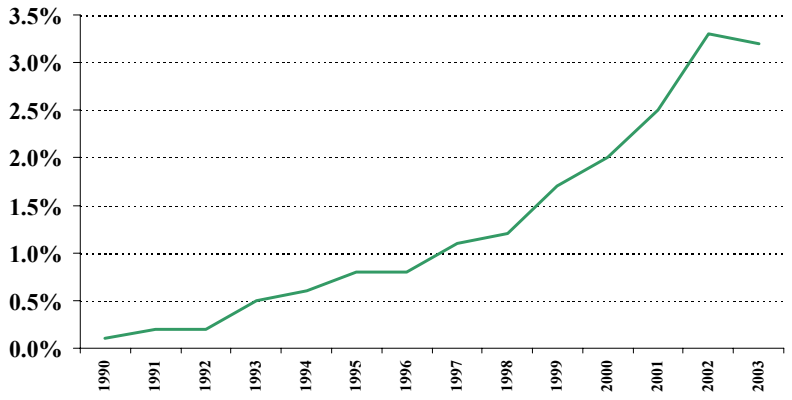
Figure 59. U.S. Market Share for Softwood Structural Lumber, 1955 - 2003



Data Source: USDA Forest Products Laboratory

Historically, North American producers have dominated the U.S. market for softwood structural lumber. However, since 1990 offshore softwood lumber imports have increased over 3,000%. Offshore imports accounted for only 0.1% of the U.S. structural lumber market in 1990; they now account for 3.5% of the market. This trend is expected to continue, as large amounts of softwood lumber move into the global market from New Zealand, Chile, Baltic and Siberian Russia, and plantations in Africa in coming years. Given that the United States is a leading consumer of wood, it is anticipated that much of this wood will come to U.S. markets in future years.

Figure 60. U.S. Market Share for Softwood Dimensional Lumber – Offshore Imports



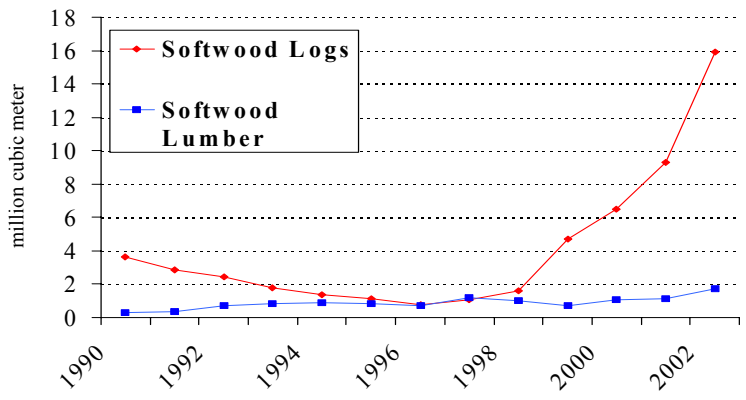
Data Source: USDA Forest Products Laboratory

Note: *Offshore imports data does not include significant Canadian imports*.

While offshore imports have increased, changes in global trade may open up new markets for Maine lumber producers as well. For example, China – the world's fastest growing economy, is quickly developing a middle class. This middle class has the beginnings of Western consumption habits, and many industry observers believe that demand for Western-style housing will provide a significant new market for wood in coming years.

China imports both logs and lumber for domestic use. Since 1999 log imports have taken off, while lumber imports to China have risen at a much more modest rate.

Figure 61. Chinese Log and Lumber Imports, 1990 - 2003



Data Source: USDA Forest Products Lab

Maine Opportunity – Maine International Trade Center

The Maine International Trade Center (MITC), formed in 1996, is a centralized source of information on international business and markets. MITC provides technical assistance and trade counseling, import and export leads, international credit reports, workshops, coordinated trade missions and trade shows, and other general services to Maine businesses seeking to participate in international markets.

MITC has a diverse membership of over 200 businesses, which includes members from all sectors of the forest products industry. These include several hardwood and softwood mills, secondary wood product manufacturers, one paper company, and a log broker. Some of these companies have taken advantage of MITC's representation and demonstration of their products abroad, providing them access to international markets at reduced rates and with minimal staff commitment.

MITC has a professional staff with international trade and industry-specific expertise, including composite technologies, wood products and lumber. One MITC staff member interviewed for this project noted that within the past year he has worked with four or five of the nine forest product firms in their membership.[58] According to MITC staff, it sees its role as assisting the smaller and medium-sized companies in the forest products industry. Many of the larger sawmills and paper companies maintain staff knowledgeable with international trade issues and do not seek out MITC's services. This is reflected in the MITC members from the industry, who generally represent smaller locally owned companies.

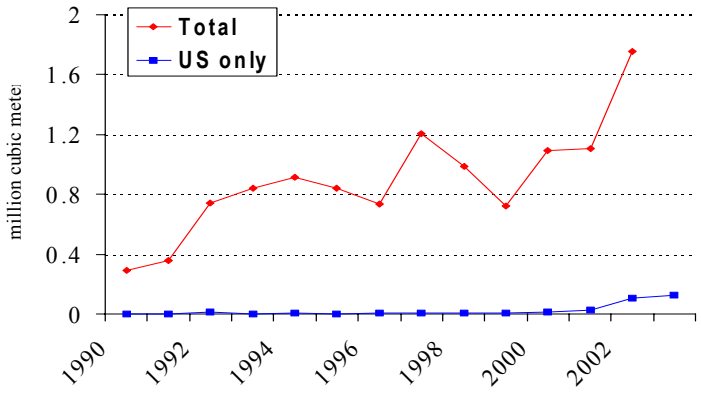
Although attitudes of forest products companies toward international markets vary, MITC points out that many of the forest products companies in their membership focus more on domestic markets. This sometimes depends on the strength of the US dollar and resource supply issues but also on trade issues such as the battle over softwood lumber with Canada or with specific trade requirements in foreign markets such as European softwood import regulations.

One of the most important aspects of MITC is its ability to make sense of the complexity of international trade, from markets to logistics to regulations. This is an important service for many Maine businesses, especially those intimidated by the prospects of the bureaucratic hurdles posed by international trade.

[58] Personal communication, Cory Crocker, Technical Assistance Manager, MITC, September 30, 2004.

To date, U.S. forest product manufacturers have not made meaningful inroads into the Chinese lumber market. Chinese imports of U.S. lumber have risen from a low of 0.3% in 1993 and 1997 to 6.2% in 2002. Given the large number of shipping containers that bring Chinese-manufactured consumer goods to East Coast ports and return to China with low transportation rates, there may be an opportunity for some Maine mills to establish ties to this growing market.

Figure 62. Chinese Softwood Lumber Imports, 1990 - 2003

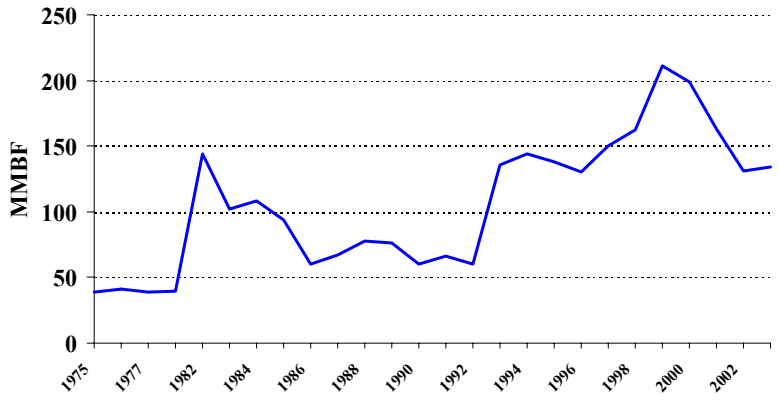


Sources: USDA Forest Products Lab

Hardwood Lumber

Maine hardwood lumber production has grown significantly from 1975 to the present, from 39 MMBF in 1975 to a peak of 211 MMBF in 1999. Maine hardwood production had declined modestly to 134 MMBF in 2003.

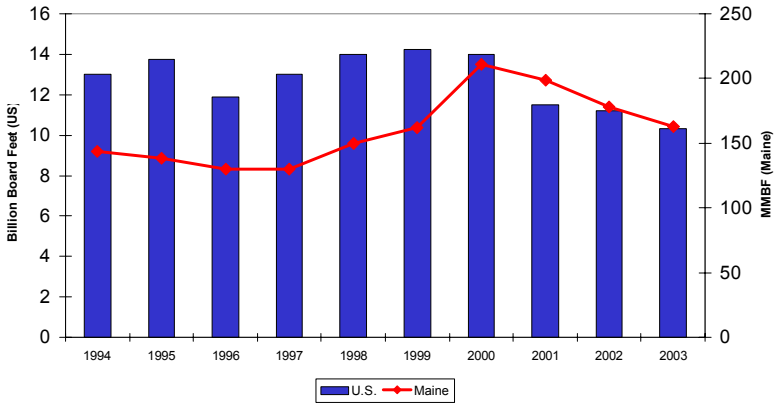
Figure 63. Maine Hardwood Lumber Production, 1975 - 2002



Data Source: U.S. Department of Commerce, Census Division

Maine hardwood production (red line, right axis below) has generally followed U.S. production (blue bars, left axis below) over the last decade. Maine production has dropped off in proportion to U.S. production since the production peak in 2000.

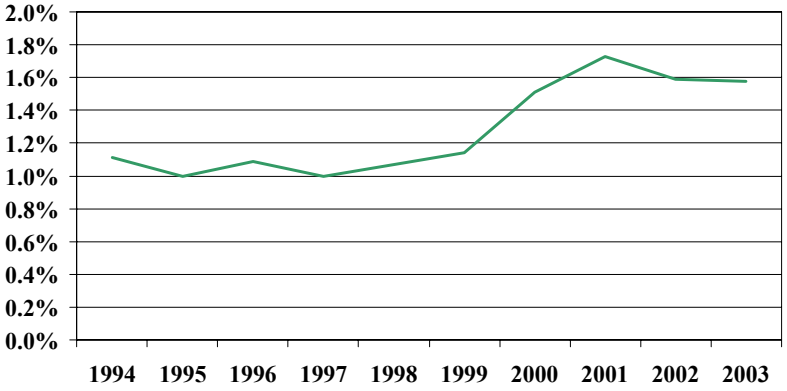
Figure 64. U.S. and Maine Hardwood Lumber Production, 1993 - 2003



Data Source: Hardwood Review and U.S. Department of Commerce

Maine is home to one of the nation's "Top 50" hardwood sawmills (as measured by production volume).[59] Nationally, Maine is a very small portion of overall hardwood production, with less than two percent of U.S. hardwood coming from Maine. However, Maine has been building market share, and has increased its percentage of U.S. production over 60% since 1997.

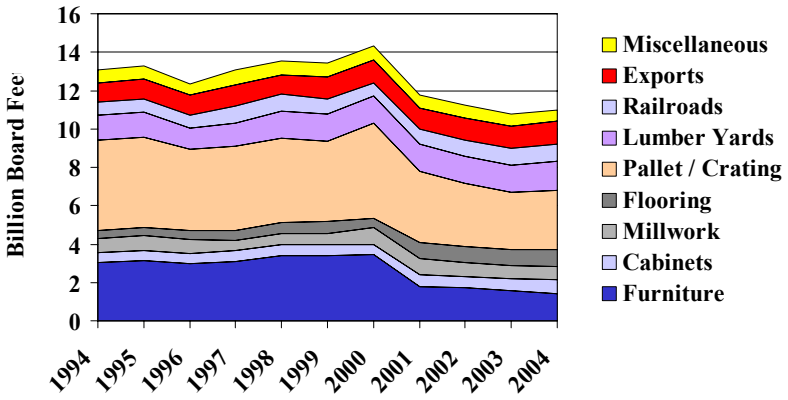
Figure 65. Maine Hardwood Lumber as a Percentage of U.S. Production



[59] Donnell, Rich. *"Top 50 U.S. Hardwood Sawmills". Timber Processing Magazine*. July / August 2004.

U.S. hardwood lumber production has declined since a peak of 14.25 BBF in 1994, and now stands at 11.35 BBF. The furniture industry and pallets dominate hardwood use in the U.S.; other markets include retail lumberyards, flooring, millwork, and cabinets.

Figure 66. U.S. Hardwood Lumber Use[60]

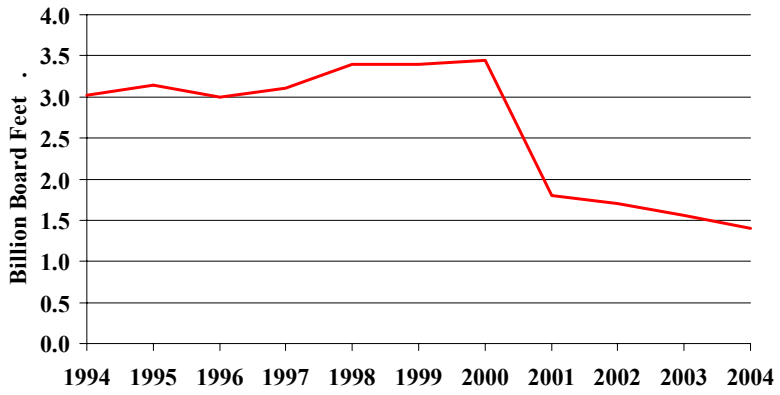


Data Source: Hardwood Review

[60] Barrett, George. Editor, Hardwood Review. *U.S. Hardwood Industry in a Global Economy*. Presented at the N.H. Forest Industry Summit. June 11, 2004.

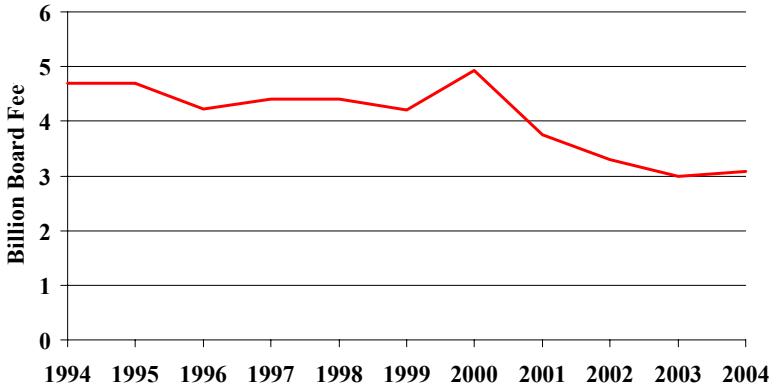
Furniture represents an important market for higher grades of hardwood lumber. U.S. lumber production used in U.S. furniture markets has declined dramatically in the past four years, and is now only half of what it was in 2000. Much of this decline has been due to furniture manufacturing moving offshore, particularly to China.

Figure 67. Hardwood Use in Furniture, U.S.



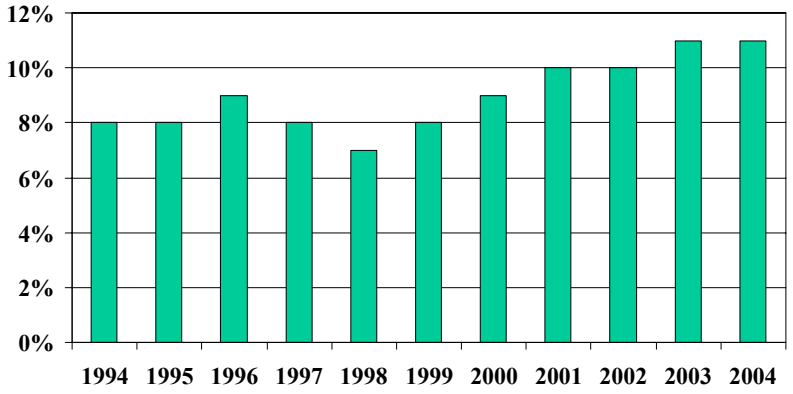
Pallets are an important market for low-grade hardwood lumber. Hardwood production used in pallets has also declined from a peak in 2000, with a volume decrease roughly mirroring furniture. Much of this is due to overall declines in U.S. manufacturing, which uses pallets to transport finished product to market. As some manufacturing losses are not expected to return to the U.S., this presents serious concerns regarding long-term markets for low-grade hardwood.

Figure 68. Hardwood Use in Pallets & Crating, U.S.



During this period of declines in the furniture and pallet industry, exports have roughly held steady, at 1.1 to 1.2 BBF per year. Due to a declining overall market for hardwood, exports have become a more important part of the nation's hardwood sector.

Figure 69. Percent of U.S. Hardwood Production Exported



Outlook

Maine lumber manufacturers, both hardwood and softwood, have been making significant investments in new capacity in order to position themselves for the future. Maine sawmills have added capacity at the same time that they have cut expenses, providing them with higher productivity. It should be noted that increased capacity does not necessarily translate to increased profitability for the industry, and many industry members we have spoken to indicated that they are now coming out of a long period of limited profitability. In order for Maine sawmills to remain competitive, the trend of investments in productivity must continue; failure to do so will result in mills in other areas gaining increased advantage over Maine mills.

The forest industry and policy makers must recognize that it is likely that some sawmills (as well as other manufacturers) will grow larger and more productive while others will be unable to compete and close. Further, those mills that are most competitive will do so by controlling input cost – including labor. Productivity gains can be achieved through increased production with the same number of employees; gains can also be realized through stable production with fewer employees. For this reason, using employment as an indicator of overall industry health could lead an observer to an incorrect conclusion.

Maine sawmill production, while important to the state, is a small portion of the nation's production. However, Maine mills enjoy some natural advantages, including proximity to the largest concentration of consumers in the world. Maine sawmills also face some challenges, discussed elsewhere in this report – including high electricity costs, transportation hurdles and comparatively high labor overhead (e.g., benefits, workers compensation). Some of these costs are particularly difficult for Maine mills that operate in the shadow of Canadian competitors, which operate under a very different economic system.

Maine softwood sawmills, particularly those producing structural lumber, must continue to invest in cost control and increased productivity to remain competitive. Wood can now travel the globe, and imports are beginning a penetration of U.S. softwood markets that is only expected to increase. As both U.S. housing starts and size are likely to remain stable or growing for the near-term, and Canadian and offshore lumber is currently more expensive than historical averages due to the exchange rate, Maine mills may continue the trend of increased capacity. However, this window of opportunity must be used to position successful mills for the future; failure on the part of industry to invest in productivity increases will mean that Maine mills will lose market share once the exchange rate returns to traditional levels.

For Maine hardwood mills, the loss of significant U.S. furniture manufacturing, coupled with declining overall manufacturing (and associated reduced pallet use) are troubling signs. As the U.S. and world economies recover, Maine hardwood mills will likely enjoy a period of increased profitability, and this provides a window for mills to establish new markets – including exports – and invest in increased productivity. Maine hardwood production is a small percentage of U.S. hardwood production, and opportunities may exist for Maine to differentiate itself in the marketplace. Particularly for hardwood lumber that is used in consumer goods, Maine mills may be able to establish consumer recognition that secures market share or price premium.

Secondary Wood Products

Secondary wood processing[61] is generally considered to be the continued manufacturing of solid wood beyond the production of boards. Maine has a well-developed and diverse secondary wood products sector, and Maine-manufactured secondary wood products include:

> "Apple Boxes, Arbors, Architectural woodwork, Art, Bark/Landscape material, Barrels, Baskets, Bins, Bird feeders, Blanks, Boats, Boxes, Buckets, Cabinets, Canoe parts & accessories, Carvings, Casework, Child swing/play sets, Christmas trees, Clothes pins, Containers, Crafts, Custom woodwork, Decking, Dimension stock, Doors & Windows, and Dowels.
>
> Fencing, Fixtures, Flooring, Furniture (home, office, outdoor), Furniture parts, Games & Toys, Gazebos, Handles, Homes (log, modular, post & beam), Ladders, Lattice & Trellis, Lawn & garden accessories, Lobster traps, Lumber, Medical Implements, Millwork & Moldings, Musical instruments, Novelties & Souvenirs, Oars and Paddles.
>
> Pallets, Panels, Patterns, Poles & posts, Railroad ties, Rulers & Yardsticks, Screen Doors, Shavings, Shelving, Shingles & Shakes, Siding, Signs, Sporting goods, Squares, Stairs, Stakes, Tools, Trusses, Turnings, Wreaths, and lots of other items."[62]

Secondary wood manufacturing is facing unprecedented challenges, both in Maine and across the U.S. These challenges are very real and growing, and current Maine secondary manufacturers that are thriving are becoming innovators in developing new approaches to business.

Due to the wide range of products made by secondary wood product manufacturers, this is an incredibly difficult group to get reliable statistics on. In Maine, secondary product manufacturers run from firms producing millions of golf tees to firms that make a handful of pieces of custom furniture each year.

General State of the Secondary Wood Products Industry in the United States

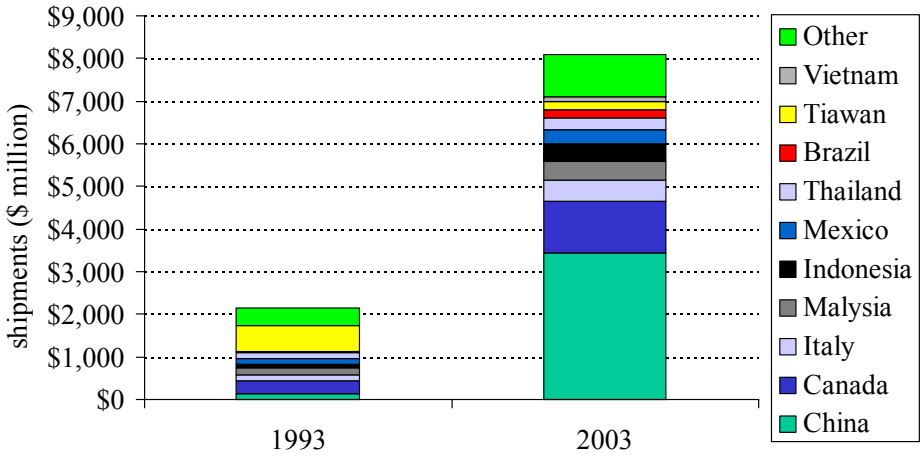
The national secondary forest products industry is incredibly diverse, and it is certainly the case that some firms or sub-sectors do well while others do not. That said, it cannot be ignored that secondary forest product manufacturers have been particularly hard-hit by an escalation of imports. During the past decade, one-third of the furniture market

[61] Also often referred to as "value-added wood manufacturing"
[62] Maine Wood Products Association, www.mainewood.org

formerly enjoyed by U.S. manufacturers has been lost to imports – and this is continuing to spread to other secondary wood markets.[63]

In the furniture industry, imports have risen dramatically, with the value of furniture imports rising from $2.15 billion in 1993 to $8.09 billion in 2003[64]. By far, the greatest increase in imports came from China, which has increased exports from $139.2 million in 1993 to $3.43 billion in 2003.

Figure 70. U.S. Furniture Imports, 1993 and 2003



Data Source: Hardwood Review

In furniture and other secondary wood industries, the increase in global trade and transportation has created a number of low-cost competitors – a phenomenon that is likely to only increase in future years[65]. For example, Russia is not currently a major player in U.S. furniture markets, but some industry analysts predict that they may become so as they "reorganize their forestry sector to focus on value-added opportunities for the country, which also holds the world's largest standing softwood inventory."[66]

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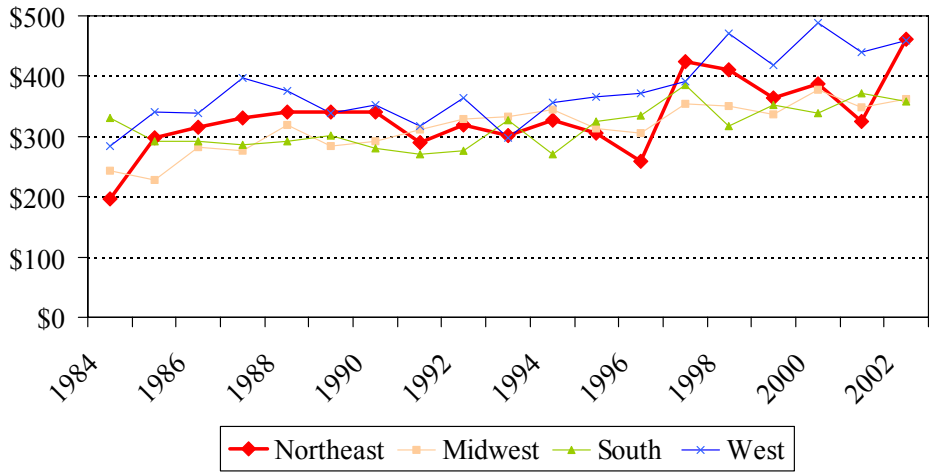
[63] Schuler , Albert and Urs Buelmann. *Identifying Future Competitive Business Strategies for the U.S. Residential Wood Furniture Industry: Benchmarking and Paradigm Shifts.* USDA Forest Service, Northeastern Research Station, General Technical Report NE-304. March 2003.
[64] Barrett, George. Editor, Hardwood Review. *U.S. Hardwood Industry in a Global Economy.* Presented at the N.H. Forest Industry Summit. June 11, 2004.
[65] Dossenbach Associates LLC / AKTRIN. *Secondary Wood Products in Vermont.* 2002.
[66] Schuler , Albert and Urs Buelmann. *Identifying Future Competitive Business Strategies for the U.S. Residential Wood Furniture Industry: Benchmarking and Paradigm Shifts.* USDA Forest Service, Northeastern Research Station, General Technical Report NE-304. March 2003.

This surge in imports has come at a time when U.S. consumers are slowly and steadily increasing their per-capita furniture expenditures. In 1984, the average Northeastern consumer spent $196 annually on furniture (wood and non-wood); this more than doubled to $461 in 2002[67].

Figure 71. Per Capita Expenditure on Furniture, U.S. Regions



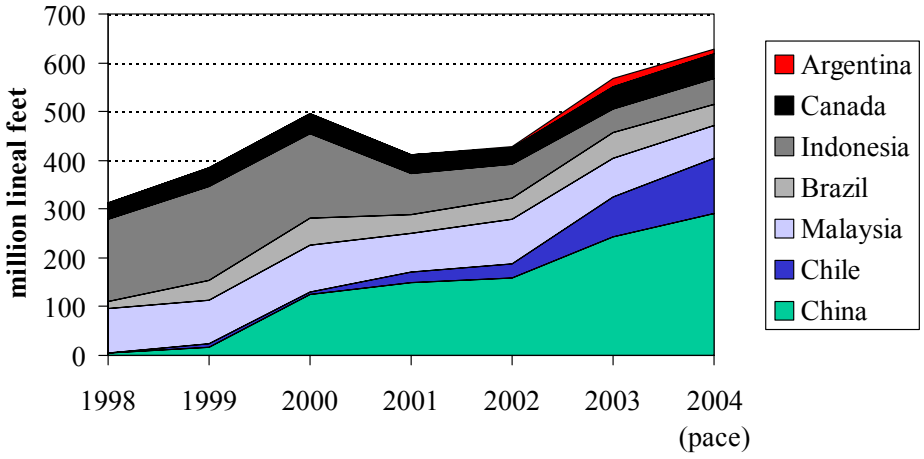
Data Source: U.S. Bureau of Labor Statistics

During this same time period, the size of the average new house has increased, and is expected to continue to do so, with an increase of 10% over existing average size (2,300 square feet) by 2010.[68] Coupled with anticipated increases in home remodeling, this will likely lead to significant overall increases in demand for furniture in the U.S. for the next decade. The great challenge (and opportunity) for U.S. manufacturers, and Maine manufacturers in particular, is how to capture some of this demand increase.

[67] These are not inflation adjusted dollars, but even after adjusting for inflation the increase is significant. Assuming 3% annual inflation, $196 in 1984 would be equivalent to $344 in 2002.
[68] National Association of Homebuilders. *The Next Decade for Housing*. 2002.

As with furniture, imports of hardwood molding have increased dramatically, and it is anticipated that 2004 imports (in linear feet) will be double the 1998 import level.

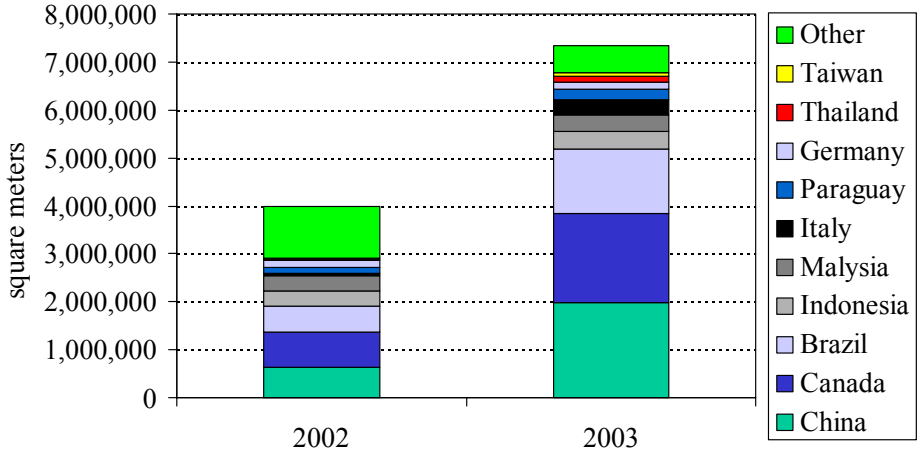
Figure 72. U.S. Imports of Hardwood Molding



Data Source: Hardwood Review

Imports of flooring are growing even faster than imports of furniture or molding. Imports of flooring grew almost 85% in one year, with single year increases of over 100% from China, Canada, Brazil, Italy, Thailand and Taiwan.

Figure 73. Solid Hardwood Flooring Imports



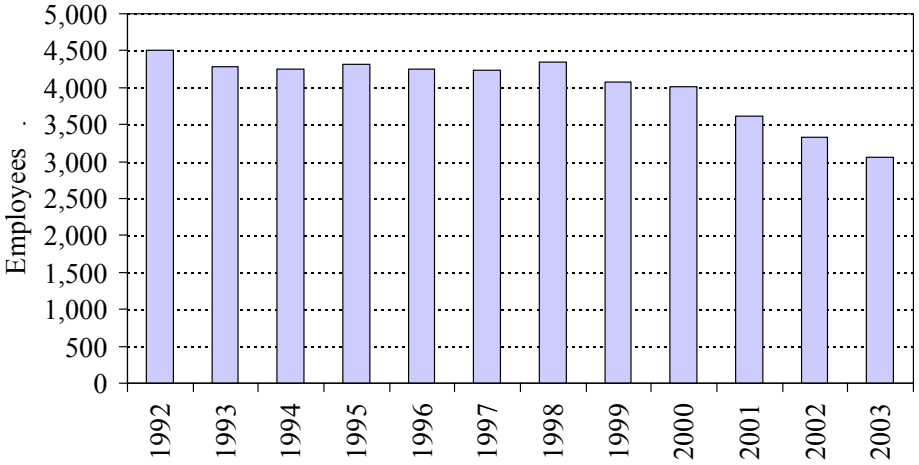
Data Source: Hardwood Review

General State of the Secondary Wood Products Industry in Maine

Because of its great diversity, it is difficult to generalize about the state of secondary wood products manufacturing in Maine. A large number of facilities have closed in recent years (for example, Bickford Woodworking, C.B Cummings & Sons, Cornwall Wood Products, Forster Inc., H.G. Winter & Sons, Houlton International, Kendall Dowel Mill, and some operations of Saunders Brothers), while other facilities have added additional secondary processing capacity (for example, Robbins Lumber, Pride Manufacturing and Bethel Furniture Stock). As markets change and develop, some companies have been well positioned to take advantage of these changes; others have not.

The recent employment trend for Maine wood product manufacturers is downward. In 1992, Maine had roughly 4,500 people employed in the non-sawmill wood products manufacturing (NAICS code 3219[69]); by 2003 that had dropped to around 3,000.

Figure 74. Employment Trends, Wood Product Manufacturing, 1992 - 2003

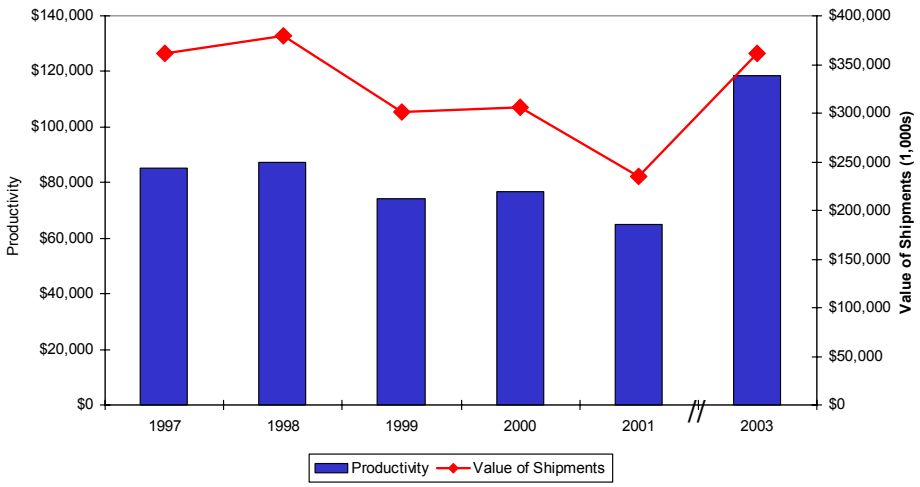


Data Source: Maine Department of Labor

[69] NAICS is a government system for tracking employment and other trends by industry. NAICS code 3219, *Other wood product manufacturing*, is defined as "establishments primarily engaged in manufacturing wood products (except establishments operating sawmills and wood preservation facilities; and establishments manufacturing veneer, plywood, or engineered wood products)."

Interestingly, this means that employees in the secondary wood products sector became significantly more productive during this time period, with per-employee output increasing from $85,325 per employee in 1997 to $118,334 per employee in 2003.

Figure 75. Value of Shipments and Employee Productivity, Wood Products Manufacturing



Data Sources: U.S. Census Bureau and Maine Department of Labor

Maine manufacturers have lost some markets to non-wood competition, and it is not likely that these markets will return to wood products or to Maine in the near future. Examples include toy pieces or tool handles that were historically made from wood at Maine turning facilities, and are now made with plastic. For high-end or specialty markets some of these products are still made with wood, but this has gone from a commodity to a niche market in recent years.

Case Study - Bethel Furniture Stock

Founded in 1958 by Roger A. Favreau, Bethel Furniture Stock, Inc. has been producing wooden parts for the furniture industry from locally grown hardwoods ever since. In 1979, the company was taken over by Roger's son Leon, who has assumed the CEO role during the ensuing 25 years. In 1985 the company entered the solid wood bending field utilizing Radio Frequency equipment designed and built by the company. Leon Favreau, an engineer by training, has always seen innovation as the ticket to success with this company.

In the mid-1990s, sales began to fall as Bethel Furniture Stock felt serious competition by overseas producers. China was and is still a strong competitor but so is our northern neighbor, Canada.

Amidst struggling sales, a 2001 fire in one portion of the mill, and an in-house self-insurance plan for employee healthcare that took several big hit claims over a several month period, in June of 2002 Favreau closed the operation to re-organize. Bethel Furniture Stock opened its doors just a few days later with a much reduced workforce (from about 75 before the shut-down to less than 40 after), a new approach to healthcare coverage instituted a short while later – they started health reimbursement accounts instead of insurance for employees – and a new reinvigorated attitude to succeed.

While the product mix for the firm continues to be wide-ranging, including -- solid wood bendings, edge glued panels, fully machined chair seats, machined bent components, laminated panels, compressed wood, and compressed wood bendings - - a new product line developed before the shut-down started to take off. This product line, a series of chair kits in 5 hardwood species, may be the promising new product that will lead Bethel Furniture Stock into the growth they desire. The company sells them as kits or fully assembled and, as Favreau says, they are of "unique design" such that they are differentiated in the marketplace.

Favreau said, "Despite the challenges we have had with healthcare and fire insurance costs, we can work toward growth and strength again with this expanding kit product line. All we need is some large new orders, which are starting to come."

The company believes it could double production of the kit products (they even have a new table kit in the marketplace now) as soon as the demand hits. The equipment they have in place can handle that kind of increase in production though they might need to increase the current workforce of 43 full-time and 8 part-time employees. The company believes the workers are out there if the pay is sufficient.

When the shutdown occurred, state government was quick to offer assistance but, ultimately, it took the management minds in the company to pull off the re-start and continued operations. Chain-of-Custody certification under the Forest Stewardship Council has only yielded orders for 3 chair kits in the last year. This may result in more demand over time but, according to Favreau, it has not been very helpful yet.

The big challenges that still remain for Bethel Furniture Stock fit into three categories:

- insurance costs (both healthcare and fire are tops here, workers comp rates have not been a huge issue for this company);
- raw material cost – hardwood logs are more scarce and more costly than at any other time for the Bethel company;
- competition – Canada and China top the list.

Despite the challenges he's faced in the years he has run the company, Favreau is optimistic. "I think we can make this company successful by continuing to make the quality products we are known for. We just need more markets, especially for our kit products. Our very skilled and proficient employees will see to it that we fill the extra demand when it arrives."

Labor-Intensive Manufacturing

More so than other types of forest product manufacturing, secondary forest product manufacturing has a tendency to be labor intensive. Because the U.S., and Maine in particular, has a comparatively high wage and benefit average when compared with other manufacturing regions of the world, it is highly unlikely that products or processes that are mass-produced and require a high degree of labor will be profitable in Maine. As one secondary manufacturer noted in a newspaper interview, "It comes down to American labor-intensive manufacturing – it's out of here, and it ain't coming back."[70]

Experts familiar with the international furniture industry have estimated other countries have extensive cost advantages over U.S. manufacturers, to the extent that even if U.S. manufacturers cut their labor costs by 95%, they still could not produce furniture at a cost lower than Chinese manufacturers can deliver it to the United States.[71] The U.S. government has recently imposed duties on some Chinese furniture of *up to* 198%, but industry observers believe that this will only shift production to other Asian nations, not return manufacturing to the United States[72].

[70] Brad Cummings quoted in: Canfield, Clarke. "Running out of Wood Work." *Portland Press Herald.* March 1, 2003.
[71] Dossenbach Associates LLC / AKTRIN. *Secondary Wood Products in Vermont.* 2002.
[72] Donnell, Rich. "China Slapped with Duty." *Timber Processing Magazine.* Volume 29, Number 7. September 2004.

While all sectors of the forest industry face challenges from imports, secondary manufacturers are in the most difficult position because it is easy for secondary product manufacturing to occur at locations distant from the forest resource. This is because manufacturing inputs – lumber, boards, turning blanks – can be shipped to manufacturing facilities across the globe. In many cases, foreign (particularly Asian) producers may be well positioned to import manufacturing inputs using low-cost shipping opportunities made available when shipping companies seek to return otherwise empty shipping containers (shipping containers used to import finished products to the United States).

Outlook

As stated earlier, it is extremely difficult to make general statements about the highly diverse sector encompassed in secondary forest products manufacturing. It is certain that Maine's secondary forest product manufacturing is undergoing significant changes, and it has likely entered a period of nearly constant change. Maine has seen some long-time secondary product manufacturing firms close, and it will likely see more. At the same time, other firms have found niches or opportunities to create new secondary manufacturing opportunities.

Speaking generally, Maine wood products tend to be expensive when compared to globally available products, and Maine manufacturers are not positioned as least-cost producers. There are limited (and diminishing) opportunities for standardized, commodity type secondary product manufacturing in a high wage and benefit state like Maine (or anywhere in the U.S.) This is not going to change in the next ten to twenty years, and successful secondary forest product manufacturers will not try to compete directly with least cost producers.

Instead, successful Maine firms will be competitive on value – offering a product that meets customer needs at a reasonable price. Depending upon the product, components of value may include quick turn-around time, the ability to customize small production runs, and superior customer support. The latter value idea may be keyed to perceived superior quality due to local production (the "buy local" factor – a form of branding). Non-quantitative factors, such as entrepreneurial attitude, managerial ability, and having a dynamic business model may prove to be some of the critical elements of future success.[73]

Additionally, Maine firms will need to focus on and invest in productivity improvements – a focus that is likely to result in some job losses. However, failure to invest in new equipment that increases productivity will eventually lead to existing industries becoming wholly uncompetitive, thus losing all jobs associated with a facility.

[73] Schuler , Albert and Urs Buelmann. *Identifying Future Competitive Business Strategies for the U.S. Residential Wood Furniture Industry: Benchmarking and Paradigm Shifts.* USDA Forest Service, Northeastern Research Station, General Technical Report NE-304. March 2003.

Micro-businesses, a portion of secondary manufacturing in Maine, often are well positioned to take advantage of emerging opportunities. Micro-businesses often are, by nature of their size, able to quickly adjust operations to meet emerging opportunities. Further, micro-businesses -- or networks of micro-businesses – generally do not produce undifferentiated mass quantities of products, and thus are less susceptible to foreign competition, if marketing capitalizes on this.

What we do know is that Maine secondary manufacturers that have survived are creative and nimble, both in production and marketing, and have been investing in productivity improvements. As noted in a recent Maine Wood Products Association newsletter, "[the] long-term solution is different for each company, but probably includes some combination of niche marketing, customization, quick turn-around, and great customer service."[74] This will need to continue, as opportunities to succeed will likely come and go rapidly. Companies that are well positioned to take advantage of opportunities – coupled with a regulatory and tax structure that encourages rapid deployment of new technologies – will be positioned for future success.

[74] Wentworth, John. "A Message from the MWPA President." *MWPA Splinters.* October 2004.

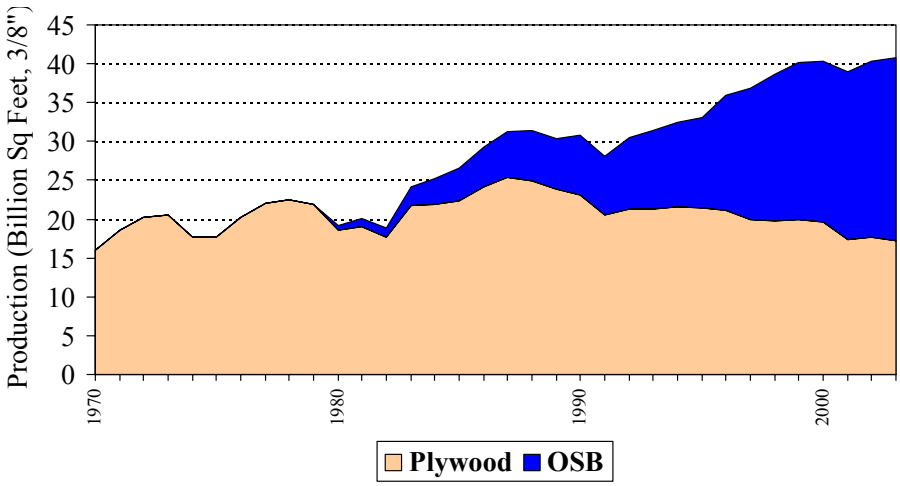
Engineered Wood Products

Engineered wood composites refer to products in which wood fiber is reconstituted with resins or other adhesives to produce a new product. Examples of engineered wood products used in Maine include structural panels (plywood and oriented strand board), composite lumber, glue-laminated lumber, and laminated veneer lumber. Engineered wood is often made with lower grades of wood or wood residues, has uniform characteristics, and is frequently cost-competitive when compared to other wood or non-wood alternatives.

Engineered lumber is the fastest growing segment of the forest industry nationally, with a market in 2002 of over $8 billion in the U.S. and Canada[75]. Engineered wood products include a number of "commodity" products – including oriented strand board, particleboard and fiberboard – as well as highly specialized products developed to meet the demands of certain niche markets.

Structural panel products – most notably plywood and OSB – have a long history in the North American market. Since entering the North American market in the late 1970's, OSB has made continuous inroads into the structural panel market, and from 1999 on has held more (and growing) market share of the structural panel market.

Figure 76. North American Structural Panel Production, 1970 - 2004

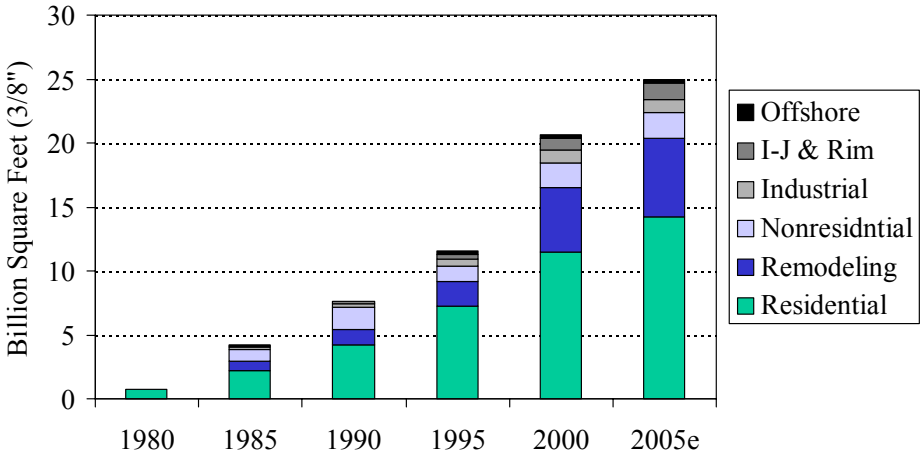


Data Source: APA - The Engineered Wood Association

[75] Personal Communication with Jack Merry, APA – The Engineered Wood Association, July 13, 2004

The great bulk of OSB is used in residential construction and remodeling applications, with both of those markets growing steadily since OSB entered the North American marketplace. This means that, as with lumber, housing starts and housing size are important indicators of where the OSB market may be headed.

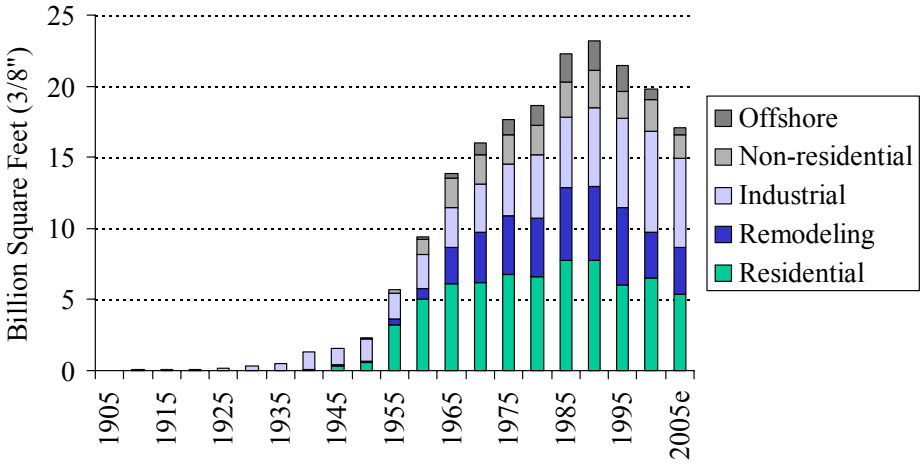
Figure 77. North American OSB Markets – 1980 to Present



Data Source: APA - The Engineered Wood Association

At the same time, the North American market for plywood has declined, with much of the market lost to OSB. Plywood does retain some significant markets for residential construction and remodeling, and is quite strong in industrial applications (for example decked pallets, shelving, construction forms, bus floors and truck interiors).

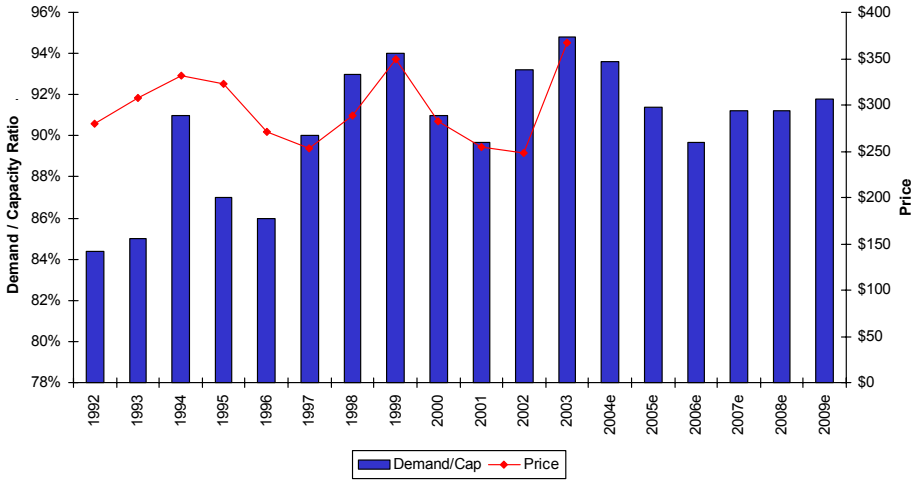
Figure 78. North American Plywood Markets – 1980 to Present



Data Source: APA - Engineered Wood Association

Structural panel prices have reached all-time highs in the past year, but are already declining as new facilities come on-line. The demand-to-capacity ratio (the amount of demand as a percentage of available production capacity) is expected to decline in coming years, and it is logical to assume that some high-cost mills will curtail production or close. While it is impossible to know what mills will be affected by the marketplace, it should be of significant concern to Maine that some mills may be idled because Maine structural panel mills as a group are older and higher cost than other North American facilities.

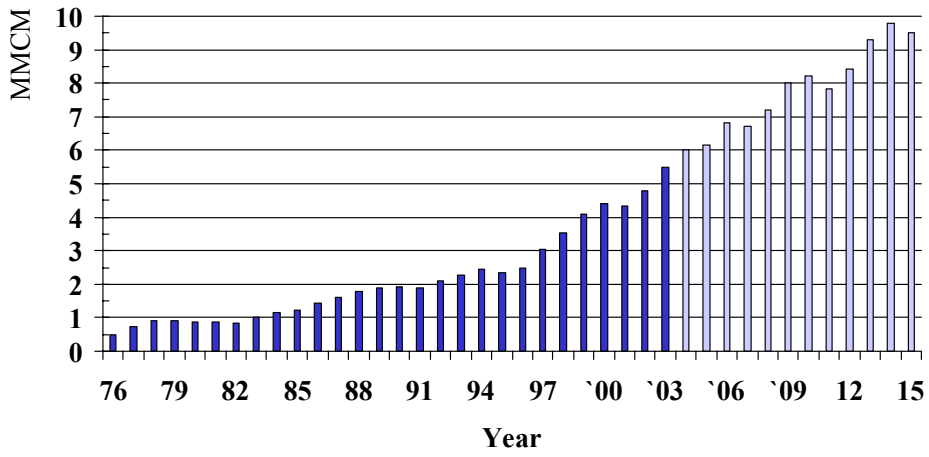
Figure 79. North American Demand to Capacity Ratio, Structural Panels -- 1992 to 2009 (estimated)



Data Source: APA - Engineered Wood Association

In addition to structural panels, the market for non-structural panels (such as medium density fiberboard, or MDF) has been growing rapidly, and is anticipated to continue doing so. MDF, used in a variety of non-structural applications such as furniture and cabinets, has grown in North American production from 0.5 million cubic meters in 1976 to 5.5 million cubic meters in 2003. Production is expected to reach nearly 10 million cubic meters by 2014.

Figure 80. North American MDF Production, 1976 – 2014 (projected)



Case Study -- Feasibility Analysis of Medium Density Fiberboard Facility in New Hampshire

In 2001, the New Hampshire Department of Resources & Economic Development commissioned a generic[76] feasibility study for a medium density fiberboard (MDF) manufacturing facility in that state. This report was part of a larger effort to identify potential new markets for low-grade wood, and was led by Innovative Natural Resource Solutions LLC and Draper/Lennon, Inc. [77]

The analysis included a complete investigation of the MDF production process, resource availability and pricing from mill residue and roundwood, electric and thermal energy consumption, capital costs associated with production, estimates of operating costs, revenue estimates, and calculations of return on investment.

[76] The study did not identify a particular site for the facility, operator, management team or brand of equipment to be used.

[77] This complete analysis is available from the New Hampshire Division of Forest & Lands website, listed under "Low-Grade Wood Studies" at www.nhdfl.org/publications

Two individuals who helped design and build a number of MDF and other engineered wood facilities in the U.S. aided in this analysis.

An MDF facility represents a major investment, and the authors estimated that $153 million would be needed to build a facility with an annual production of 130 million square foot (3/4" basis). The feasibility analysis determined that an MDF facility in New Hampshire would be profitable, but not at a level that would attract investors. Key issues that contributed to the facility being economically under-attractive were:

- MDF is a highly energy-intensive process, and high electricity prices in New Hampshire proved a deterrent. In order to address this, the analysis specified a biomass co-generation plant as part of the facility, with electricity and thermal heat derived from this facility. While this helped mitigate the projected cost of energy (electricity and thermal heat), this added $22 million to the total cost of the project, an expense not necessary in other regions of North America.
- Wood costs in New Hampshire were projected to be marginally higher than in other regions, in part due to the need to rely on roundwood instead of sawdust, a preferred feedstock in the industry.
- The cost of trucking or otherwise transporting the finished product to its final market was anticipated to be higher than in other regions. This is because MDF is not generally used directly by consumers, but instead is used in ready-to-assemble furniture, store fixtures, laminated flooring, moldings and cabinets. In time consumers of MDF could locate close to the facility, but only current markets – largely concentrated outside of New England – were assumed as part of the study.

Following public release of this study, a number of companies contacted the authors to indicate that they had previously conducted proprietary feasibility analysis of MDF facilities in New England, and had reached similar conclusions.

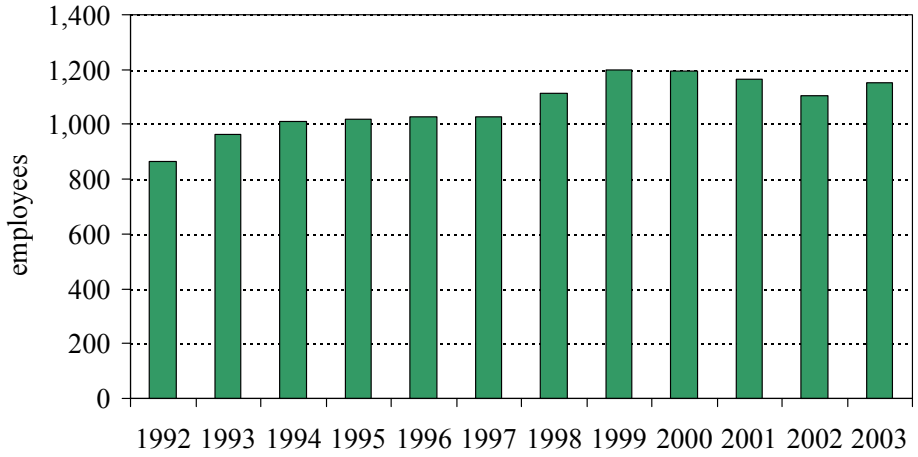
A complete re-examination of the feasibility analysis, including updating of all cost and revenue estimates, would be necessary to draw firm conclusions about the feasibility of an MDF facility in Maine. However, given the probability that electric costs would be in the same range as New Hampshire and transportation costs would be similar, it is unlikely that an MDF facility in Maine would currently prove attractive to investors. In Quebec or New Brunswick, which have significantly lower electricity costs, an MDF facility may be more economically attractive.

Engineered Wood Product Manufacturing in Maine

Engineered wood product manufacturing -- including oriented strand board, fiberboard, and more recently composite lumber – are an important part of Maine's forest industry. Theses facilities provide a market for lower grade wood or mill residue, and produce value-added products used in construction and other applications.

Maine engineered wood facilities (including, for purposes of this data, veneer plants) currently employ around 1,100 individuals.

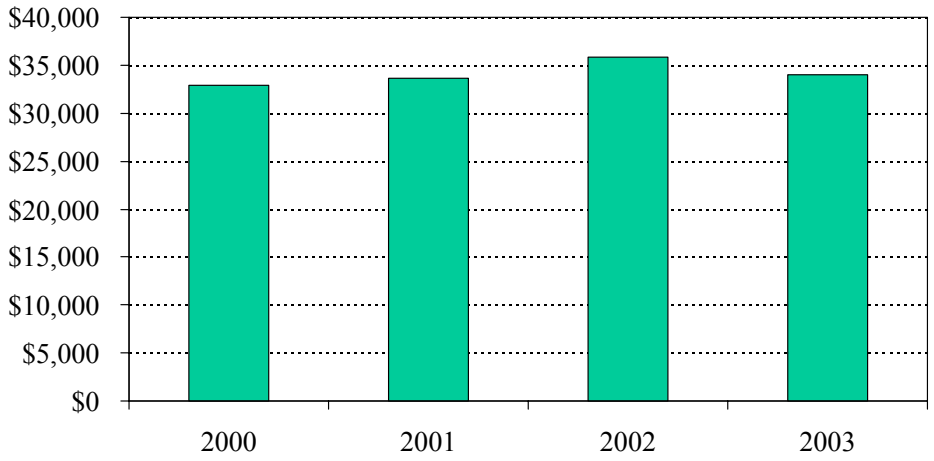
Figure 81. Engineered Wood Product Manufacturing Employment, 1992 - 2003



Data Source: Maine Department of Labor

In the time period 2000 to 2003, the average wage of employees in engineered wood product facilities has remained relatively stable, slightly below $35,000 per year.

Figure 82. Average Wage, Engineered Wood Product Manufacturing, 2000 to 2003.



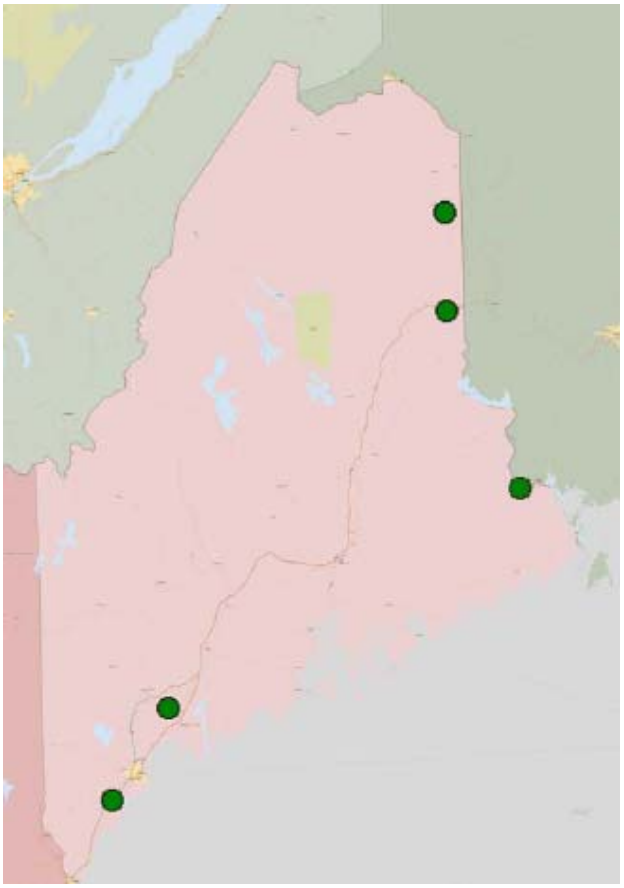
Data Source: Maine Department of Labor

Maine currently has five *major* engineered wood product facilities, as well as several small or start-up companies that are manufacturing engineered wood products. The major engineered wood facilities in Maine are:

Company	Product	Town
Correct Building Products	Composite Decking	Biddeford
Huber Engineered Woods LLC	Oriented Strand Board	Easton
Knight-Celotex LLC	Fiberboard	Lisbon Falls
Louisiana-Pacific Corp.	Oriented Strand Board	Houlton (New Limerick)
Louisiana-Pacific Corp.	Oriented Strand Board	Woodland

The location of these facilities is shown in the following map.

Figure 83. Major Maine Engineered Wood Product Facilities



Existing Engineered Wood Facilities

Maine has five major engineered wood product manufacturers, and a number of smaller firms engaged in the manufacture of engineered wood products. At the commodity level, Maine firms produce Oriented Strand Board (OSB) and fiberboard. OSB is a structural panel that uses roundwood flakes (longitudinally manufactured flakes as opposed to the chips produced for biomass energy or paper which are chipped across the grain) bonded together using water-resistant and heat-resistant resins. Fiberboard is a non-structural panel product made by breaking down wood fiber through a pressurized mechanical pulping process and then reconstituting it into a uniform consistent sheet material. One major Maine facility produces a composite decking product.

Because of the small number of Maine individual firms (one or two) engaged in each product line described below, issues at existing facilities are dealt with in relatively general terms in order to allow company information to remain confidential.

Oriented Strand Board

Maine OSB facilities are old and small by today's standards. Maine OSB mills were built in the early 1980's (the early days of OSB production in North America), and each have an annual production capacity of between 200 million and 265 million square feet[78], while new facilities being built have capacities of up to 850 million square feet[79]. As such, newer mills enjoy significant cost advantages from economies of scale, more efficient machinery, and other factors. Despite being smaller and higher cost facilities, Maine mills have continued to operate, with some taking downtime when market conditions dictate. They have done this through a combination of favorable market conditions (a continually growing market), specialization or positioning of product, or investment in plant efficiencies.

OSB facilities purchase roundwood -- in Maine there is a preference for aspen – and produce chips to be used in the production process. Due to the need for a highly consistent chip, mill residue is not used for this product.

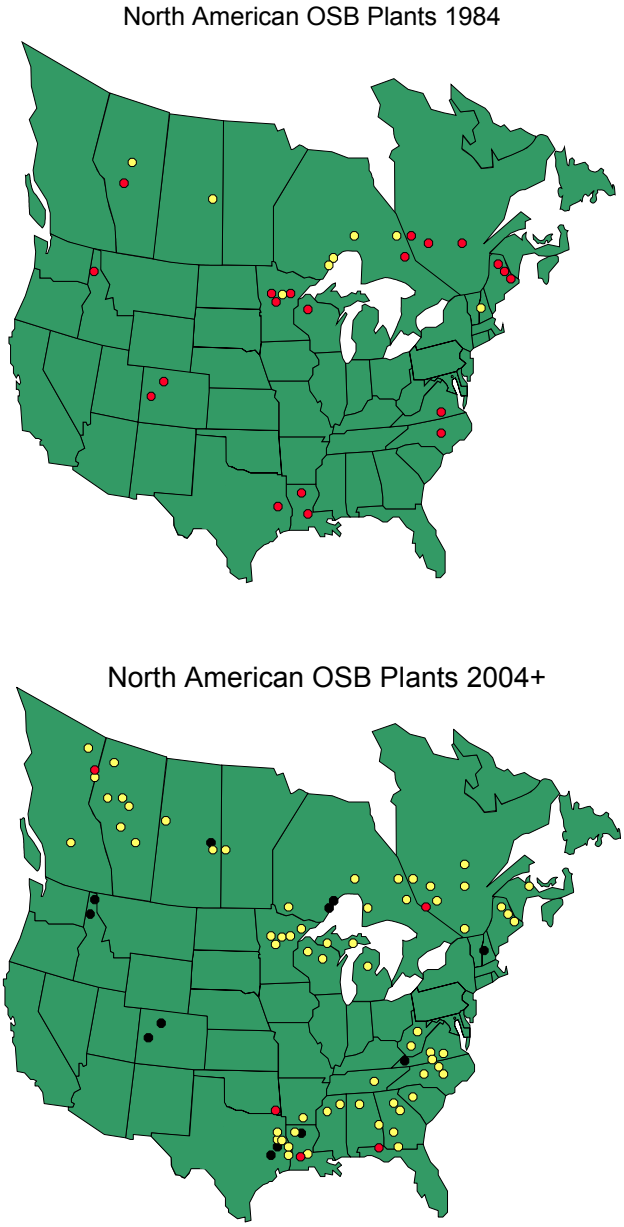
The following figure (provided by *APA – The Engineered Wood Association*) shows the geographical growth in North American OSB manufacturing since Maine's OSB facilities were built in the early 1980's. In 1984 Maine had a large concentration of facilities with three. Quebec / Ottawa had eight facilities, five were in the Lake States, and three were located in Louisiana / West Texas. Today, Maine's three facilities are still operating, but major concentrations of OSB mills have developed in the U.S. South (West Texas through Virginia and West Virginia), the Lake States, British Columbia / Alberta, and Eastern Canada (Ontario to New Brunswick). It is interesting to note that of the

[78] Personal communication, Craig Adair, Director of Market Research, APA – The Engineered Wood Association. August 20, 2004.
[79] Donnell, Rich. "Martco Chooses Site for New OSB Plant." *Panel World Magazine.* November 2004.

twenty-eight mills open in 1984, nine have closed – including one in Claremont, NH. All three Maine facilities remain open.

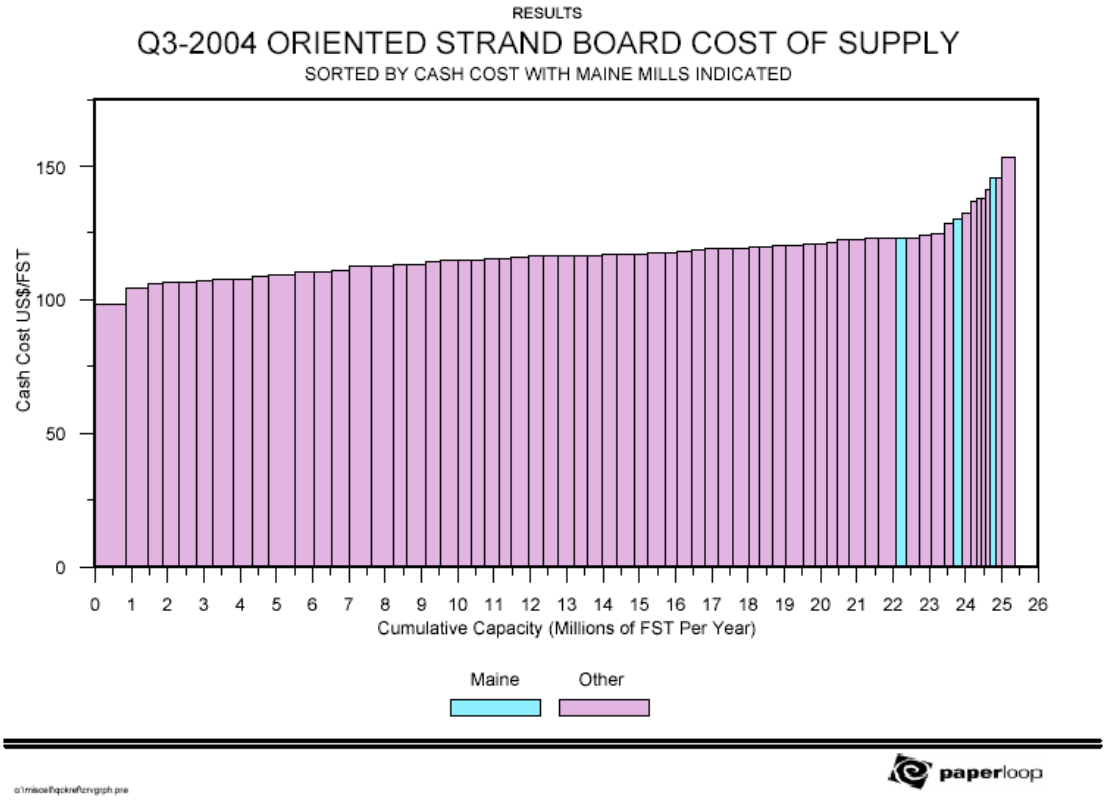
In the figure below, yellow represents older facilities (at the date of the chart), **red** represents new facilities (1980-1984 in the 1984 map, 2004 and beyond [announced] in the 2004 map), and **black** represents closed facilities.

Figure 84. North American OSB Plants, 1984 and 2004+



As part of the Maine Future Forest Economy Project, with funding provided by the Maine Technology Institute, Innovative Natural Resource Solutions LLC engaged Paperloop Benchmarking Services (Paperloop) to provide average cash cost for Maine and other North American OSB Plants. As with the cost curves for paper machines, this information is critical to helping Maine industries and policy makers understand where the state fits in the competitive global marketplace. Paperloop does not have access to exact figures on a mill-by-mill basis, but uses known information on facilities to model costs per ton of product. Paperloop provided this information specifically for this project. Specific facilities are not identified by name, but the information provides a very revealing look at Maine's competitive position for OSB. All information is for the third quarter of 2004.

Figure 85. North American Cost Curve, Oriented Strand Board



As the market for OSB matures, Maine should be aware that facilities located here are vulnerable. As older, smaller and less efficient facilities, Maine mills are more likely than many others to take downtime or close when market conditions are not favorable[80]. In terms of making capital investments necessary to keep facilities as technically advanced as possible, Maine mills have made periodic reinvestments, in both operating efficiency and in incremental production volumes (through speeding up the production line or minimizing downtime.) Unfortunately, one Maine facility recently scaled back planned capital investments significantly (cut by roughly 80% for 2005) due to high wood costs and perceived regulatory instability.

Fiberboard

Maine has one fiberboard facility, located in Lisbon Falls. This mill has been producing fiberboard since 1934, and now is capable of producing 120 million square feet of fiberboard annually[81]. This facility, which uses pine and aspen chips as a raw material (both woods-direct fiber and sawmill residue), produces a product used in covered application for office partitions, interior doors, and laminated furniture. The product produced at this facility is *not* medium density fiberboard, which uses a relatively high volume of resins as a bonding agent. Fiberboard, by contrast, uses a process similar to papermaking in order to produce the product, and is intended for applications where the product is not visible to the ultimate consumer.

Composite Decking

Maine has one large composite decking manufacturer, located in Biddeford. This facility uses hardwood sawdust and polypropylene to manufacture a "composite decking material" used in applications traditionally dominated by lumber[82]. This company is small in comparison to others in the marketplace, such as Louisiana Pacific and CertainTeed, but has established market share through innovative products and marketing. Composite decking is one part of the "composite lumber" sector, which has experienced double digit growth for several years, and is expected to continue to do so for *at least* the next four years[83].

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[80] This past year, one Maine OSB facility took downtime during some of the strongest OSB markets in recent year, indicating that they were having difficulty finding a consistent and affordable wood supply.
[81] Maine Department of Economic & Community Development. "Governor Baldacci Welcomes Knight-Celotex as Pine Tree Zone Company." *Press Release.* June 17, 2004.
[82] Correct Building Products, www.correctdeck.com (accessed August 23, 2004)
[83] Freedonia. Solicitation for "Composite & Plastic Lumber", Study #1784. April 2004.

Case Study --Correct Building Products

Correct Building Products is the manufacturer of Correct Deck®, a plastic-wood composite that is used for non-structural building applications such as decks, railings, docks, and fencing.

Correct Building Products was founded in 1999 and started operations in 2000. The company has grown rapidly. 2000 shipments were 180,000 linear feet of product; 2004 shipments will be approximately 20,000,000 linear feet. The company has 51 employees at its Biddeford headquarters and manufacturing facility, and is considering the addition of a second manufacturing facility. Correct Deck was recognized as International Innovator of the Year by the Maine International Trade Center in 2004.

Raw Materials. Correct Deck's raw materials are polypropylene and kiln-dried sawdust, in a weight:weight proportion of 40%:60%. Sawdust is procured through brokers, who source material from as far away as Pennsylvania, Quebec, and the Canadian Maritimes. The polypropylene purchased by Correct Deck is largely a recycled product; the largest supplier is the U.S. Postal Service.

In 2004, Correct Deck will consume approximately 4,000,000 pounds of kiln-dried sawdust from Maine (or approximately 1/3 of its total consumption for the year). The company states that this is nearly all of the kiln-dried product available in Maine; therefore it does not expect to increase its procurement and use of sawdust from Maine sources. Correct Deck requires a kiln-dried sawdust (which can be hardwood or softwood) to provide dimensional stability in its products. It cannot use the wet sawdust that is the product of most of Maine's sawmills.

Factors Contributing to Growth and Success.

Product. Correct Deck attributes much of its success to the fact that its products bridge a gap between functional effectiveness and good looks. Whereas most competing products look like a smooth plastic plank, Correct Deck's has a more attractive wood-grained finish. This product differentiation is the most important factor that has allowed Correct Deck to penetrate a market already well populated with products from larger, established firms.

Internet Marketing Strategy. Correct Deck has made aggressive use of the internet to grow its business. The company has a comprehensive and informative web site and uses a variety of strategies to bring customers to the site. It uses the site to stimulate buyer inquiries, which in turn stimulate dealer and distributor interest. Correct Deck makes use of this internet strategy to generate end-user demand that pulls product through the distributor chain, rather than attempting to push its product to distributors and retailers.

Inexpensive Outbound Transportation. Because Maine is no longer the source of significant outbound truck freight, the company is able to take advantage of low backhaul rates to distribute its product throughout the Northeast and beyond. (This situation has a costly reverse side, in that inbound transportation of Correct Deck's raw materials is relatively expensive.)

Barriers to Growth.

Raw Material Costs. The cost of CD's raw materials has increased dramatically since the company started business. The cost of kiln-dried sawdust has increased by a factor of 4.5 since 2000, and the cost of polypropylene resin (which tracks oil prices) has increased nearly as much. The impact of these increases is lessened by the fact that they also affect competing producers of "plastic lumber" products, but they do affect Correct Deck's competitive position compared to pressure-treated lumber and other wood decking.

Maine Business Taxes. Maine's business tax structure, particularly the business income tax, is a significant barrier to growth and profitability.

Electric Power Costs. The cost of power is rated as an "irritant", and not a major barrier. The company believes that Maine businesses are asked to shoulder an unfair proportion of statewide electricity costs in order to hold down rates paid by residential customers.

Use of Business Planning and Business Assistance Resources

Correct Deck has taken advantage of many sources of assistance available through or supported by the State and Federal Governments. In general, the company states that these resources have been easy to identify and access, and their assistance (technical and financial) has been critical to the company's success in multiple areas.

Maine Technology Institute. Correct Deck was the recipient of a grant from the Maine Technology Institute that provided important early-stage financial assistance.

Small Business Association Loan Guarantee. Working with Key Bank, the company received a U.S. Small Business Administration 7A loan guarantee, which secured the financing of equipment purchases.

Maine Patent Program. The company has used assistance from the Maine Patent Program to help determine whether several of its technical innovations are patentable.

Maine Small Business Development Center. Correct Deck made extensive use of on-site technical resources provided by the SBDC program for business planning and management assistance during its first years.

Maine Manufacturing Extension Partnership. This for-profit agency has provided expertise to help solve technical/engineering issues for the company.

Correct Deck's involvement with the ***Maine Finance Authority*** was the one state program interaction cited as frustrating. Correct Deck believes that the MFA's emphasis on immediate job creation is over-restrictive – limiting the Authority's assistance to ventures (like Correct Deck) for which job creation is a secondary or longer-term impact.

Emerging Opportunities in Engineered Wood Product Manufacturing

In addition to existing commodity products, engineered wood products are expanding into new, more demanding applications. This trend of new engineered wood applications addressing specialized, non-commodity application, holds potential promise for Maine industries.

AEWC Center

Maine is home to the Advanced Engineered Wood Composites (AEWC) Center, a "globally recognized leader in composite research and development…[for] the next generation of cost-effective, high-performance, wood-nonwood composite materials."[84] Located at the University of Maine in Orono, the AEWC Center is a leading research facility with state-of-the-art capabilities to help usher an engineered wood product from the conceptual stage through research, manufacturing of prototypes, testing and evaluation, code approval and commercialization.

The AEWC Center has among its missions to actively pursue "commercialization, entrepreneurship, and job creation in Maine and beyond."[85] As such, the AEWC Center has enormous potential as a resource for the State of Maine, the region, and the state's forest industries as a cutting-edge research center. The AEWC previously received federal funding to "support technology transfer, economic development and commercialization of wood-based composites"[86], and hired an "Innovation Specialist", whose responsibilities included helping bring AEWC-developed technologies to the marketplace. This funding, and position, has expired[87].

As part of its efforts to spur commercialization of AEWC-developed engineered wood products in Maine and the northeast region, the AEWC Center is partnering with the Eastern Maine Development Corporation and the Town of Greenville on an "incubator site", where in addition to manufacturing space, tenants can access shared support services, technical support from the AEWC Center, and business support.[88] The AEWC Center has identified at least four innovative products that could be produced at the Greenville site using locally available resources.

Research and development is a slow process, and not one where instant results can be expected. While the AEWC Center is a world-class research and development institution, it currently has limited capacity to effectively connect new ideas with all Maine businesses that can best take advantage of these opportunities[89]. The vast majority of the AEWC Center's funding comes from contract research conducted for specific

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[84] *The AWEC Center: Services, Facilities and Personnel.* 2003.
[85] *The AWEC Center: Services, Facilities and Personnel.* 2003.
[86] National Science Foundation. *Project Activities: Development and Commercialization of Advanced Wood-Based Composites in Maine*. www.nsf.gov (accessed August 25, 2004)
[87] Personal Communication, Habib Dagher and Stephen Shaler, AEWC Center, August 30, 2004.
[88] www..umaine.edu/Greenville/greenville_business_incubator.htm (Accessed August 24, 2004)
[89] Personal Communication, Habib Dagher and Stephen Shaler, AEWC Center, August 30, 2004.

clients, and this work is done to address specific needs of companies or other clients (including federal agencies). However, some of the work AEWC does leads to new products or product enhancements that could provide significant economic opportunities to existing or new Maine forest industries.

As a research and development institution, the AEW Center's focus is on the research they conduct. AEWC is actively working with Maine businesses to develop new products and has worked with over 50 Maine businesses. While AEWC is working with many Maine businesses, they would like to do more. AEWC presently does not have staffing or other relationships that allow it to conduct sustained and significant outreach to Maine forest industries and others that may have an interest in taking AEWC-developed technologies and turning them into business opportunities. This includes the ability to write business plans for industries, design, specify and price out new production lines, etc. If such staffing or relationships were to be developed, this could help Maine firms make better use of new technologies, provide the AEWC with additional funding through licensing fees, and potentially spur new businesses.

Challenges Faced by New Engineered Wood Products

New engineered wood products, developed at AEWC or elsewhere, represent a real opportunity for development of new forest products or businesses. Because new products tend to be designed to meet market niches, and operate for some period of time with patent protection, the concern about some of Maine's high operating costs (e.g., electricity prices) are not as great a concern as for producers of commodity products. However, because products are seeking to penetrate markets currently served by other products, other significant challenges do exist. These include access to capital, ability to consistently secure sufficient wood fiber, security of intellectual property rights, and the time and marketing needed to introduce a new product to market.

Case Study – Engineered Materials of Maine

Engineered Materials of Maine (EMM) licensed one AEWC technology, a beam and column composite product. In October 2002 the company launched operations, and began producing product in February of 2003. The company's inauguration was accompanied with significant fanfare and high expectations.[90] Using AEWC Technology, EMM used low-grade hardwood lumber to manufacture structural beams. This provided a market for low-grade hardwood lumber, and allowed Maine products to enter a market previously dominated by softwood products manufactured elsewhere in the U.S.[91]

Unfortunately, the company closed in December of 2003, roughly a year after it was founded. Press reports have blamed the company's failure on a wood shortage.[92] At the time the company was beginning, the demand for both low-grade hardwood logs and lumber increased, causing prices to rise. Because it was a very new market entrant, EMM did not have established relationships with suppliers, and as a fledgling company was not in a position to increase the price it paid for wood.

At the same time it was facing rising wood costs, or even the inability to find appropriate wood, the company was facing challenges common to start-ups. The company was introducing a new product to the marketplace, had to create demand, and refine its marketing efforts based on experience. All of these things take time and money, and the new company did not have the cash reserves to face these challenges *and* the unanticipated rise in wood costs.[93]

While obviously disheartening, lessons can be learned from this experience[94]:

- Business plans must at minimum recognize that the wood market is dynamic, and historic prices can change – up or down – due to a wide variety of factors. Capitalization plans and cash reserves from investment must better recognize this tenuous early business period.
- Stand-alone start-ups are less able to handle inevitable challenges that a start-up associated with an established company will encounter. For this reason, firms seeking to grow their product line, or build upon existing presence in the marketplace, are often better suited to bring a new product to market.
- Firms with an existing presence in the forest products industry are better positioned to use relationships and knowledge during times of tight wood markets. For this reason, building relationships with existing Maine companies could be crucial to the success of some new products.

[90] Nagle, Margaret. "Capitalizing on Research; Development of engineered construction materials at Umaine leads to commercial enterprise." *UMaine Today Magazine.* January / February 2003.
[91] Wickenheiser, Matt. "From Academia to the Marketplace." *Maine Sunday Telegram*. July 6, 2003.
[92] Turcotte, Deborah. "Wood shortage cited in closure of composite lab." *Bangor Daily News.* January 20, 2004.
[93] Elliot, Alan. "UM wood composite center redirecting efforts." *Bangor Daily News.* May 24, 2004.
[94] Personal communication, John Fuitak, August 31, 2004 and Tyler Reed, November 8, 2004.

Outlook

Maine's engineered wood companies fall into two large categories – existing, commodity producers and emerging specialty producers. Within these larger categories there are a number of subcategories. It is this diversity that gives Maine's engineered wood sector great opportunity and promise.

For existing commodity producers, there are some significant concerns. Maine's OSB mills are older, slower and smaller than new facilities, and as such Maine facilities operate at more input cost per unit of output. Maine mills have regularly attracted some capital investment to help keep the facilities operational, but at least one facility recently had planned investment postponed, while the company continued investment at other, non-Maine facilities. For Maine's existing engineered wood product companies, the future will vary by product and company approach to how that product is positioned. Maine facilities will need to continually reinvest in their facilities to reduce operating costs. Additionally, Maine manufacturers may need to look for ways to move commodity production toward specialized production, changing production to meet the needs of smaller, less competitive markets.

For new engineered wood products, Maine has enormous opportunity but to date has not been able to fully capitalize on the world-class resource it has at the AEWC Center. Forest industry, the state and the AEWC must work together to identify the product lines that make sense for Maine's forest resource and are likely to succeed in the marketplace. All parties must recognize that there will be new engineered wood companies that fail, but that this does not mean that the product or product group is necessarily unsuited for Maine. As with many emerging technologies, it is impossible to determine what products will be made in five, ten or twenty years. However, the trend is clear – engineered wood products have an established market presence, and new products will be developed to meet emerging needs.

Biomass Electricity

State of the industry

Maine has ten facilities where biomass energy is the primary or sole product, and a large number of forest product manufacturing facilities that burn wood to generate steam, heat, and electricity for internal use or sale. Maine's biomass energy plants, particularly the stand-alone plants designed solely to produce power for the grid, were constructed and commissioned in the 1980's, when public policy encouraged construction of renewable energy facilities. Under state and federal law, utilities were mandated to provide long-term contracts for electricity from these facilities at rates that, in retrospect, turned out to be significantly above-market. This resulted, largely, from future projections of alternative fuel source costs that proved to be grossly inaccurate. The majority of these contracts have now expired or been terminated, forcing the facilities to sell electricity into the region's wholesale market.

In the competitive market, many biomass facilities have difficulty competing against other forms of generation, including nuclear, coal, natural gas and hydroelectric generation. In a report completed in 2002 for the New Hampshire Department of Resource Economics & Development, it was *estimated* that a typical 15 MW biomass facility in the region ($18/green ton fuel) could generate electricity for $56/megawatt hour (MWH).[95] Current long-term electricity prices in the region are $40 to $44 per MWH, while spot market prices are often temporarily above the $56 per MWH level. In an analysis of electricity prices conducted in New Hampshire, it was forecast that regional electricity prices will reach a level where existing biomass facilities can be profitable, without external support, around 2014.[96]

Some Maine facilities have found ways to succeed, often by controlling fuel costs (including use of wood from non-forestry sources, including construction & demolition debris), taking advantage of "green" power markets, and timing operation to take advantage of fluctuations in the electricity market. However, as many as six biomass plants have been idled for periods of time in recent years, demonstrating that economically viable operation is currently difficult.[97]

Biomass co-generation at forest product companies has proven to be a much more stable venture, with facilities taking process heat and steam from the boiler, as well as making electricity for internal use or sale. A number of Maine pulp and paper mills use biomass to power some or all of their operations, and Georgia Pacific is in the process of adding a biomass facility (formerly located in Athens, Maine) to its operations in Old Town.

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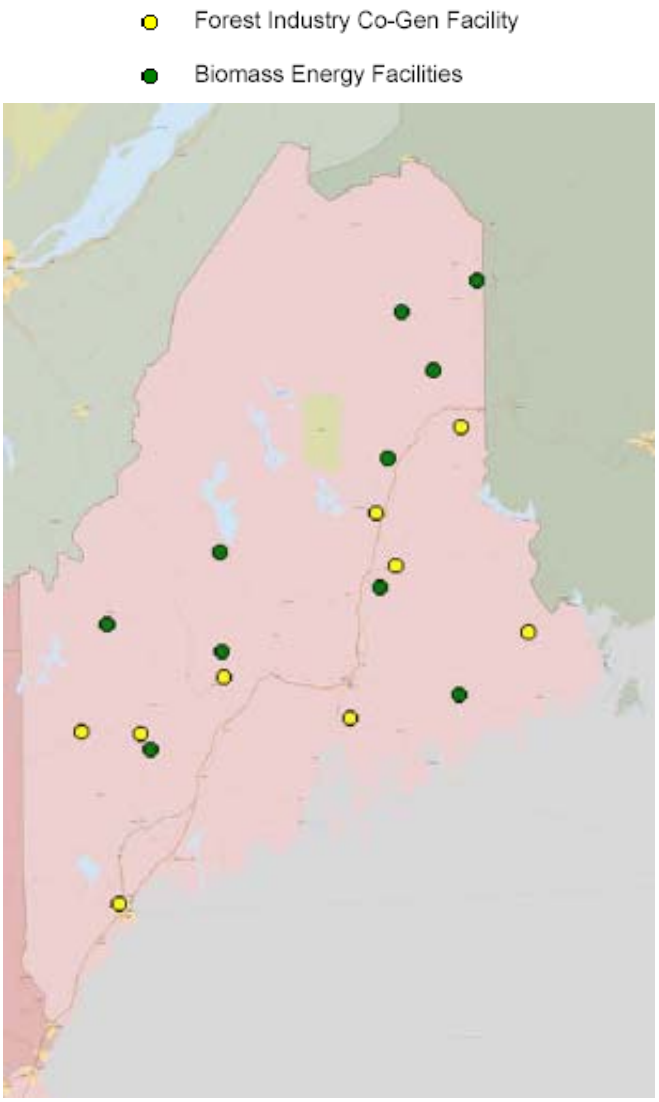
[95] Innovative Natural Resource Solutions and Draper Lennon, Inc. *Identifying and Implementing Alternatives to Sustain the Wood-Fired Electricity Generating Industry in New Hampshire.* Developed for the NH Department of Resources & Economic Development. January 2002.
[96] NH Governor's Office of Energy & Community Services. *New Hampshire Energy Plan.* November 2002.
[97] Maine Public Utilities Commission. *Report and Recommendations on the Promotion of Renewable Resources.* December 31, 2003.

Geographic Distribution of Biomass Energy Facilities in Maine

Maine has stand-alone biomass electricity facilities, as well as a number of forest industry firms that use biomass to generate electricity and steam for their own use, and often electricity for sale on the regional electricity grid. The map below shows Maine stand-alone biomass electricity plants that can use at least 100,000 green tons of wood annually (green), and forest industry co-generation sites that used at least 90,000 green tons of wood in 2002 (yellow)[98]. This map does not show the biomass facility in Athens, which is currently being moved for use at Georgia Pacific's pulp and paper mill in Old Town[99].

Figure 86. Biomass Energy Facilities in Maine



[98] Data Source: Personal communication, Becky S. Hodsdon, Air Toxics and Inventory Section, Bureau of Air Quality, Maine Department of Environmental Protection

[99] Maine Department of Environmental Services, *Departmental Findings of Fact and Air Emissions License*, March 2004

Electric Service Areas

Maine is divided into two electricity markets. Much of Maine is located in the ISO-New England region (also known as the NEPOOL region), and is part of the larger New England electricity market, along with all of Connecticut, Rhode Island, Massachusetts, Vermont, and New Hampshire. Formed to manage a restructured and competitive market for wholesale electricity, duties of the ISO include "…providing independent, open and fair access to the region's transmission system", and "facilitating market based wholesale electric rates."[100] Maine's wood-burning biomass facilities in the ISO – New England Region include:

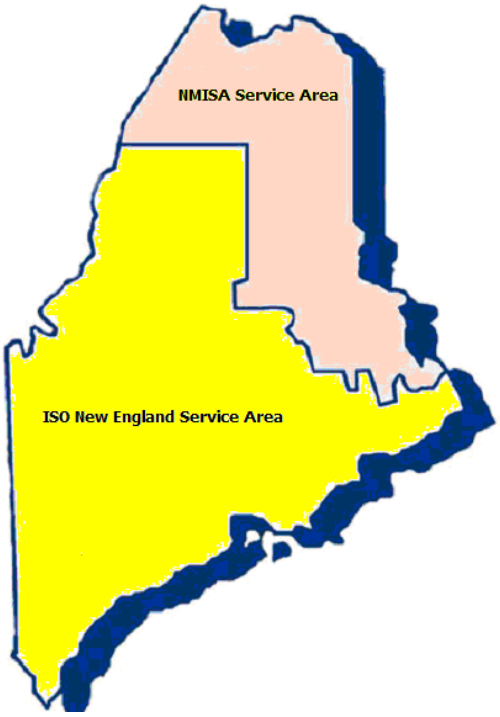
- Boralex – Livermore Falls, 37 MW
- Boralex – Stratton, 45 MW
- Indeck – West Enfield, 26 MW
- Greenville Steam, 14.3 MW,
- Worcester Energy (Deblois)[101], 25 MW,
- Indeck - Jonesboro, 27 MW, and
- GenPower LLC has proposed a 40 MW facility at the site of a former Boralex facility in Athens, Maine.[102]

Parts of Northern Maine are not in the ISO-New England region, and instead are part of the Northern Maine Independent Service Administrator (NMISA) region. This distinction is critical for understanding how Maine firms may participate in the Renewable Portfolio Standards (RPS) of other states. There are currently three biomass facilities in the NMISA region:

- Wheelabrator - Sherman, 18.1 MW
- Boralex - Fort Fairfield, 32 MW
- Boralex - Ashland (presently idle), 37 MW

[100] ISO New England website, www.isone.org
[101] Worcester Energy is currently re-tooling to burn wood and participate in regional renewable energy certificate markets.
[102] Crowell, Alan. "Athens Voters OK Pine Tree Zone." *Morning Sentinel.* September 26, 2004.

Figure 87. Electricity Service Areas in Maine.



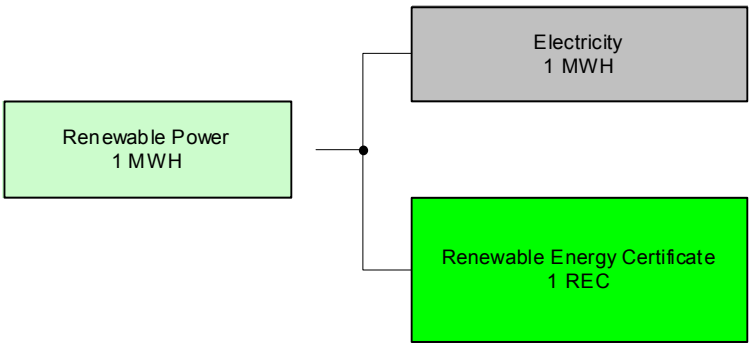
Renewable Portfolio Standards

Firms that produce electricity using biomass power now have renewed opportunity to achieve financial returns, due to state-based public policy initiatives that encourage production of renewable energy. However, these incentives entail a certain amount of risk, and investment is required in most existing biomass facilities in order to qualify for these incentives.

Regional Markets for Renewable Power

Electricity generated from renewable sources produces two separate products – first, the electricity, and, second, the "green" or renewable attributes associated with that electricity. These renewable attributes are referred to as Renewable Energy Certificates, or RECs. For each Megawatt Hour of electricity generated, one REC is generated. These two products, electricity and RECs, can be separated, or unbundled, and sold individually.

Figure 88. Products from Renewable Energy



Three states in New England – Connecticut, Massachusetts and Rhode Island – have "renewable portfolio standards" (RPS) that currently provide meaningful economic opportunities for biomass facilities to operate. Maine has an RPS, but supply exceeds demand by a significant amount, and thus does not currently provide meaningful incentives for generators. An RPS is essentially a mandate that any seller of electricity operating in that state must derive a certain portion of that electricity from renewable sources. Each state defines what qualifies as "renewable" for purposes of their portfolio standard, so that generation that qualifies in one state does not necessarily qualify in other states. Generation based in Maine can sell its renewable energy certificates (RECs) to customers in Connecticut, Massachusetts and Rhode Island, given the limitations described below.

Massachusetts Renewable Portfolio Standard

Massachusetts has a renewable portfolio standard that required 1% of electricity be procured from eligible providers in 2003, with the percentage required climbing annually until at least 2009, when 4% renewable power will be required.

Year	RPS Percentage
2003	1.0
2004	1.5
2005	2.0
2006	2.5
2007	3.0
2008	3.5
2009	4.0

However, the Massachusetts RPS has a number of eligibility criteria that restrict participation by biomass generators.

Eligible Biomass Fuel: In order to participate in the Massachusetts RPS, a facility may use biomass such as "brush, stumps, lumber ends and trimmings, wood pallets, bark, wood chips, shavings, slash and other clean wood that are not mixed with other solid waste."[103]

Qualifying Biomass Generation Unit: In order to participate in the Massachusetts RPS, a biomass generator must use "low-emission, advanced biomass power conversion technologies using an Eligible Biomass Fuel"[104]. This definition goes on to note that "pile burn, stoker combustion or similar technologies shall not constitute an advanced biomass conversion technology."[105] Two Maine biomass facilities, Indeck – Jonesboro and Indeck – West Enfield, currently qualify to participate in the Massachusetts RPS.[106] Worcester Energy has been qualified to participate in the Massachusetts RPS, subject to new emissions limits and continual emissions monitoring.[107] Other facilities would need to make significant capital investments in order to qualify for participation in the Massachusetts RPS.

Use of an Existing Wood-fired Facility: The Massachusetts RPS contains a requirement that qualifying generation not only come from "advanced technology", but also come from a "new" facility. There has been some

[103] 225 CMR 14.02: Definitions – Renewable Portfolio Standard
[104] 225 CMR 14.05 (1)(a)6: Eligibility Criteria for New Renewable Generation Units – Renewable Portfolio Standard
[105] Ibid
[106] These facilities have "vintage" restrictions due to previous operation, and thus cannot *fully* participate in the Massachusetts RPS.
[107] Massachusetts Division of Energy Resources. "Update on Biomass Projects in Massachusetts RPS; MA Biomass Working Group." September 14, 2004.

confusion about whether an existing facility can "re-tool" and qualify for participation in the Massachusetts RPS. Recent guidelines issued by the Massachusetts Division of Energy Resources have eliminated that confusion[108]. In essence, if a facility has been generating electricity in the past using a non-qualifying technology, it can re-tool the facility with newer technology (a fluidized bed, for example), and qualify for the Massachusetts RPS[109]. Maine facilities, including Greenville Steam and Boralex – Stratton (or Boralex – Livermore Falls), have received "Advisory Rulings" from Massachusetts regulators to proceed with a re-tooling from stoker grate combustion to fluidized bed combustion[110], and Worcester Energy is investing in that facility to qualify for the Massachusetts market[111]. A facility proposed by GenPower LLC at the site of a former Boralex facility in Athens has also received a preliminary ruling from Massachusetts[112].

Participation by Maine Facilities: Maine generators that sell electricity onto the grid in the ISO-New England region may participate in the Massachusetts RPS; generators located in the NMISA region may participate if they follow strict rules regarding delivery of electricity to the ISO-New England region[113].

Price Premium: Demand for Massachusetts-qualified RECs currently exceeds supply, and the price reflects this. With a price cap of $50.00 (in 2003 dollars, adjusted annually for inflation[114]), Massachusetts RECs for calendar year 2004 are trading between $45 and $48[115]. This means that <u>in addition to receiving payment for the sale of electricity</u>, a Massachusetts RPS qualified generator could receive between $45 and $48 / megawatt hour ($0.045 to $0.048 per kWh). RECs also trade for forward years. The price history of 2005 RECs is summarized below.

---

[108] Massachusetts Division of Energy Resources. "Renewable Portfolio Standard: Guideline on the MA RPS Eligibility of Generation Units That Re-Tool With Low-Emission, Advanced Biomass Technology." April 16, 2004.

[109] As this report is going to press, the Massachusetts Division of Energy Resources is considering a change in rules that would allow modest changes at existing facilities to qualify for the Massachusetts RPS. Updates on the rules can be found at http://www.mass.gov/doer/rps/index.htm

[110] http://www.mass.gov/doer/rps/advisory.htm (accessed July 12, 2004)

[111] www.cleavco.com (accessed February 25, 2005)

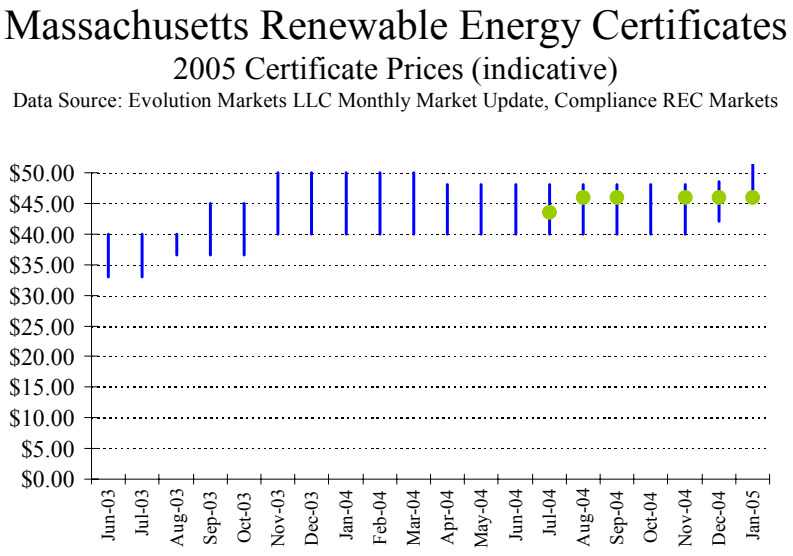
[112] Massachusetts Division of Energy Resources. *Renewable Portfolio Standard Advisory Ruling for GenPower LLC's Proposed Biomass-Fueled Generation Units in Maine and New Hampshire.* September 3, 2004.

[113] 225 CMR 14.05 (5): Special Provisions for a Generation Unit Located Outside of the ISO-NE Control Area.

[114] The 2005 Alternative Compliance Payment, which serves as the price cap, is $53.19 per MWh.

[115] Evolution Markets LLC. *Monthly Market Update: Compliance REC Markets.* June 2004.

Figure 89. Price of Massachusetts RECs



It should be noted that there is a strong possibility that REC prices will not remain at their current levels, and facilities considering investments in order to participate in the REC market should carefully analyze future supply and demand risks.

Connecticut Renewable Portfolio Standard

Connecticut has a renewable portfolio standard that requires that 6% of electricity sold in the competitive marketplace to come from renewable generation in 2002; increasing annually. Connecticut has two classes of renewables; generation from "new, sustainable biomass" (Class 1, along with wind, landfill gas, and solar) receives preference over some other types of renewable power.

Year	Class 1 RPS Percentage	Class 2 RPS Percentage
2004	1.0	5.5
2005	1.5	5.5
2006	2.0	5.5
2007	3.5	5.5
2008	5.0	5.5
2009	6.0	5.5

For a biomass facility, key components of the Connecticut RPS include definition of an eligible biomass facility, participation by a Maine facility, and price premium.

Eligible Biomass Facility: For purposes of its Class 1 RPS, Connecticut defines an eligible biomass facility as:

> "[Including], but not limited to, a biomass gasification plant that utilizes land clearing debris, tree stumps or other biomass that regenerates or the use of which will not result in a depletion of resources, provided such facility begins operating on or after July 1, 1998, and such biomass is cultivated and harvested in a sustainable manner, except that energy derived from a biomass facility that began operation before July 1, 1998, may be considered a Class I renewable energy source, provided the average emission rate for such facility is equal to or less than .075 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter and such biomass is cultivated and harvested in a sustainable manner"[116].

In other words, facilities in operation prior to this date must invest in pollution abatement equipment or new, less polluting boilers. At least two Maine facilities, Greenville Steam[117] and Boralex – Stratton[118] have received advisory rulings from

[116] Connecticut Public Act 03-135. *An Act Considering Revisions to the Electric Restructuring Legislation*.
[117] Connecticut Department of Public Utility Control. Decision: *DOCKET NO. 03-10-18. REQUEST OF GREENVILLE STEAM COMPANY FOR AN ADVISORY RULING FOR RENEWABLE PORTFOLIO STANDARD CLASS I CERTIFICATION FOR THE RETROFITTED WOOD BURNING BOILER IN GREENVILLE, MAINE*. December 18, 2003.
[118] Connecticut Department of Public Utility Control. *Decision: Docket 03-11-10. REQUEST OF BORALEX COMPANY FOR AN ADVISORY RULING FOR RENEWABLE PORTFOLIO STANDARD CLASS I CERTIFICATION FOR THE RETROFITTED WOOD BURNING BOILER IN STRATTON, MAINE*. December 18, 2004.

the Department of Public Utility Control that allow them to participate in the Class 1, provided that they meet necessary fuel and emissions criteria.

For purposes of participation in its Class 2 RPS, Connecticut defines an eligible biomass facility as one that:

> "[Began] operation before July 1, 1998, provided the average emission rate for such facility is equal to or less than .2 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter."[119]

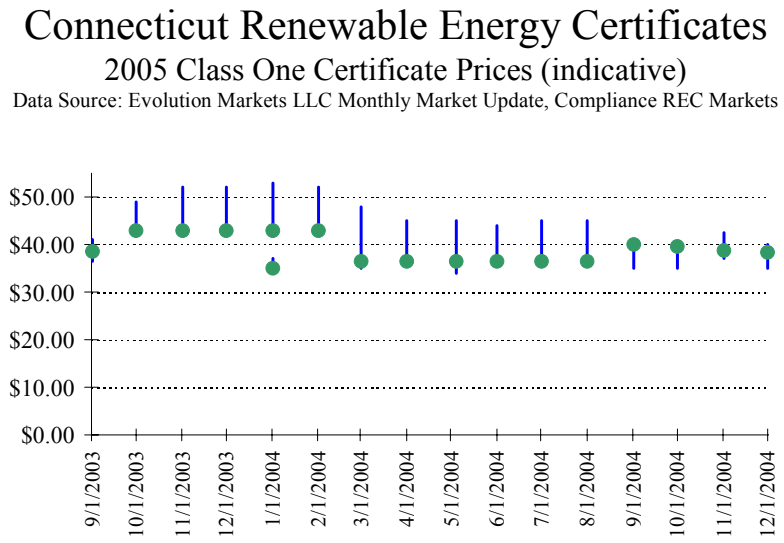
Most existing Maine biomass facilities meet this standard, but the Connecticut Class 2 RECs do not currently offer a meaningful price premium.

Participation by a Maine Facility: Connecticut allows participation in the RPS by any generator operating in the ISO-New England region, as well as the NMISA region.[120]

[119] Connecticut Public Act 03-135. *An Act Considering Revisions to the Electric Restructuring Legislation*.
[120] Connecticut Department of Public Utility Control. *Decision: Docket 04-01-12 Request of UPC Wind Partners, LLC for a Declaratory Ruling on Eligibility for Class 1 Renewable Status.* May 19, 2004.

Price Premium: Demand for Connecticut-qualified Class 1 RECs is currently strong, and the price reflects this. With a price cap of $55.00 (fixed, not adjusted for inflation), Connecticut Class 1 RECs for calendar year 2004 are trading between $35 and $44[121]. This means that in addition to receiving payment for the sale of electricity, a Connecticut Class 1 RPS qualified generator could receive between $35 and $44 / megawatt hour ($0.035 to $0.044 per kWh). RECs also trade for forward years. The price history of 2005 RECs is summarized below.

Figure 90. Price of Connecticut Class 1 RECs



It should be noted that there is a strong possibility that Connecticut Class 1 REC prices will not remain at their current levels, and facilities considering investments in order to participate in the REC market should carefully analyze future supply and demand risks.

There is currently supply in excess of demand for Connecticut Class 2 RECs, which have historically traded for less than $1.00 ($0.001/kWh)[122]. A premium of this level is often of little benefit to generators.

[121] Evolution Markets LLC. *Monthly Market Update: Compliance REC Markets.* June 2004.
[122] According to Evolution Markets LLC *August 2004 REC Monthly Market Update*, Connecticut Class II - qualified RECs trade for $0.65 for 2004 and 2006, and $0.70 for 2005.

Rhode Island Renewable Portfolio Standard

In June, 2004, Rhode Island established a renewable portfolio standard. This RPS begins in 2007, and increases annually until 2019. It contains provisions for both new and existing renewable generation.

Year	Existing	New
2007	2.0%	1.0%
2008	2.0%	1.5%
2009	2.0%	2.0%
2010	2.0%	2.5%
2011	2.0%	3.5%
2012	2.0%	4.5%
2013	2.0%	5.5%
2014	2.0%	6.5%
2015	2.0%	8.0%
2016	2.0%	9.5%
2017	2.0%	11.0%
2018	2.0%	12.5%
2019	2.0%	14.0%

For Maine biomass producers, the definition of eligible facility and the ability to participate in this market are of particular interest.

> **Eligible Biomass Facility:** To qualify as "new" for purposes of the Rhode Island RPS, a biomass facility must have begun operation (or have incremental new renewable output derived through capital investment) after 1997, use "eligible biomass fuels and [maintain] compliance with current air permits"[123]. Eligible biomass means "fuel sources including brush, stumps, lumber ends and trimmings, wood pallets, bark, wood chips, shavings, slash and other clean wood that is not mixed with other solid wastes… [and] neat liquid fuels that are derived from such fuel sources."[124]
>
> For qualification as an "existing" renewable generator for purposes of the Rhode Island RPS, the facility must meet the same definition as above, but would have begun generation prior to or during 1997.
>
> **Ability of Maine Generators to Participate.** Maine biomass facilities that sell into the ISO-New England region are eligible to participate in the RPS, as are facilities in "an adjacent control area outside" of ISO-New England, provided that the electricity is delivered to and used in the ISO-New England region.

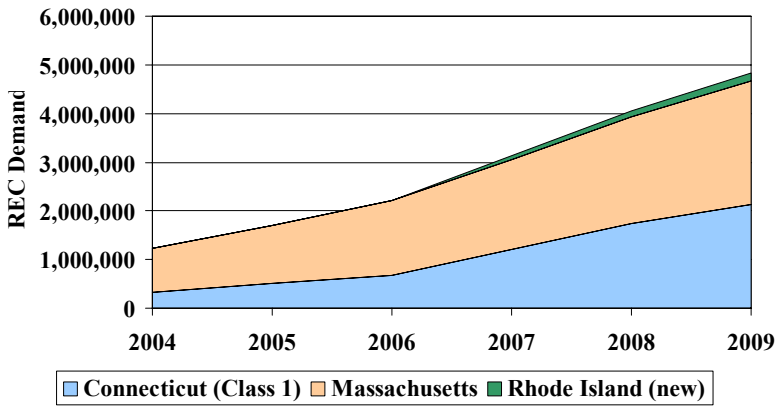
[123] State of Rhode Island General Assembly. *S. 2082. An Act Relating to Public Utilities and Carriers – Renewable Energy Standard.* June 29, 2004.
[124] State of Rhode Island General Assembly. *S. 2082. An Act Relating to Public Utilities and Carriers – Renewable Energy Standard.* June 29, 2004.

Price Premium. As the Rhode Island RPS has just been established, there is no pricing available at this time. There is a price cap of $50.00 per REC (2003 dollars), which will be adjusted annually for inflation.

Total Demand for High-Value RECs

The demand for high-value RECs will grow in coming years, as state renewable requirements increase and overall electricity demand in the region grows. This increase will provide opportunities for Maine biomass facilities, as well as others, to invest in new or more efficient generation and take advantage of REC price premiums.

Figure 91. Anticipated New England High-Value REC Demand 2004 - 2009

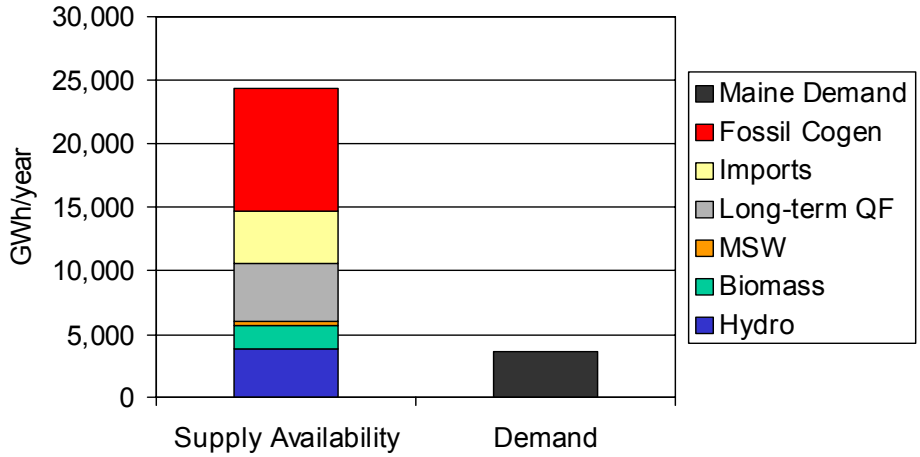


Future REC supply is unknown at this point, and is highly dynamic. A number of biomass, wind and landfill gas facilities may be built or re-tooled, but completion of many of these projects is far from certain. Any firms considering new investment in order to qualify for the REC market should thoroughly analyze anticipated REC demand, and variables that will influence future demand.

Maine Renewable Portfolio Standard

Maine has a renewable portfolio standard that requires that 30% of the electricity sold by suppliers come from either renewable generation or "efficient resources" – the highest such standard in the nation.[125] However, prior to establishment of an RPS, Maine derived roughly 45% of its power from renewable resources, primarily biomass and hydroelectric. Maine's RPS allows a great deal of generation that does not qualify for participation in the renewable portfolio of some other states. According to industry sources, the supply of electricity eligible to participate in Maine's RPS is six to eight times the demand.[126]

Figure 92. Supply and Demand for Maine-Qualified RECs[127]



Data Source: Independent Energy Producers of Maine

Because the supply is well in excess of demand, Maine-qualified RECs have minimal value in the marketplace[128]. According to a recent report by the Maine Public Utilities Commission,

> "Maine's current eligible resource portfolio requirement is not accomplishing the policy goal of promoting the use of renewable, efficient and indigenous resources

[125] www.dsireusa.org
[126] Turkel, Tux. "Renewable Energy Back on Front Burner." *Maine Sunday Telegram.* April 6, 2003.
[127] Some other analyses show a smaller supply, but all analyses show that supply exceeds demand by several fold.
[128] According to Evolution Markets LLC July 2004 REC Monthly Market Update, Maine-qualified RECs trade for $0.65 for 2004, 2005 and 2006.

that would not otherwise occur. The current mechanism is not providing financial assistance to the designated resources and technologies."[129]

Voluntary Green Energy Market

In addition to the "compliance" markets for renewable power, there exists a growing market for voluntary renewable energy purchases. In this market, individuals who want to purchase renewable power, including biomass, may do so through either selection of a renewable energy product or through purchase of RECs equivalent to some or all of their electricity use. In this market, individual consumers are generally free to enter and leave the market, and are under no regulatory requirement to purchase biomass or other renewable energy.

In Maine, the Maine Green Power Connection offers a variety of renewable energy products to electric consumers. One product, available to residential ratepayers at the price of $0.065/kwh (power only, *not* transmission and distribution charges), provides 100% renewable power from hydroelectric and biomass generation. Demand is only one-fifth of what was hoped for, and this market is not presently providing opportunities for biomass generation[130].

In the voluntary green power market, a number of marketers have found that consumers prefer "zero-emission" generation, such as hydroelectric, wind or solar. This is because most voluntary consumers choose to purchase renewable electricity in order to mitigate their environmental footprint, and prefer to pay extra to see limited or no emissions. In this regard, biomass is at a disadvantage to other renewable generation, as there are emissions associated with combustion.

Federal Production Tax Credit

At the federal level, there is a Production Tax Credit (PTC) of $0.015 (inflation adjusted) for some forms of renewable electricity generation, including wind, poultry waste and "closed-loop" biomass[131], and a tax credit of half that amount for "open-loop" biomass[132] generation that begins generation prior to 2006.[133]

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[129] Maine Public Utilities Commission. *Report and Recommendations on the Promotion of Renewable Resources.* December 31, 2003.
[130] Personal communication, Erika Morgan, Maine Energy Investment Corporation, August 3, 2004.
[131] "Closed loop biomass" is biomass grown specifically as an energy crop. No facility in the country has qualified for this tax credit since its inception in 1992.
[132] Facilities that derive their fuel from sources other than dedicated energy crops, including all biomass facilities in Maine.
[133] Edgecomb, Misty. "Wind power gets federal help." *Bangor Daily News.* October 13, 2004.

Outlook

Maine's biomass industry faces significant challenges, but strong opportunities are present, both for existing facilities and for new, cutting-edge technologies that use wood to produce electricity, chemicals, liquid fuels and other products. Without costly re-tooling to qualify for regional Renewable Portfolio Standards (such as new boilers or major investments in new emissions control devices) or some form of public policy support, Maine's existing wood-fired power plants will continue to often have significant difficulty in a competitive electricity market, where prices are set largely by the cost of generation by natural gas facilities. This will likely result in an unstable wood market, with large swings in wood demand as wood-fired power plants come start and stop electricity production based upon wholesale prices. However, public policy incentives in other jurisdictions (e.g. Connecticut, Massachusetts and Rhode Island) may provide existing biomass power plants with an opportunity to re-invest in their facilities, become more efficient, and secure price supports to cover the above-market cost of biomass electricity generation. These same incentives may provide smaller producers, such as sawmills, an opportunity to develop or improve biomass electricity generation and sell excess power into the region's wholesale market economically.

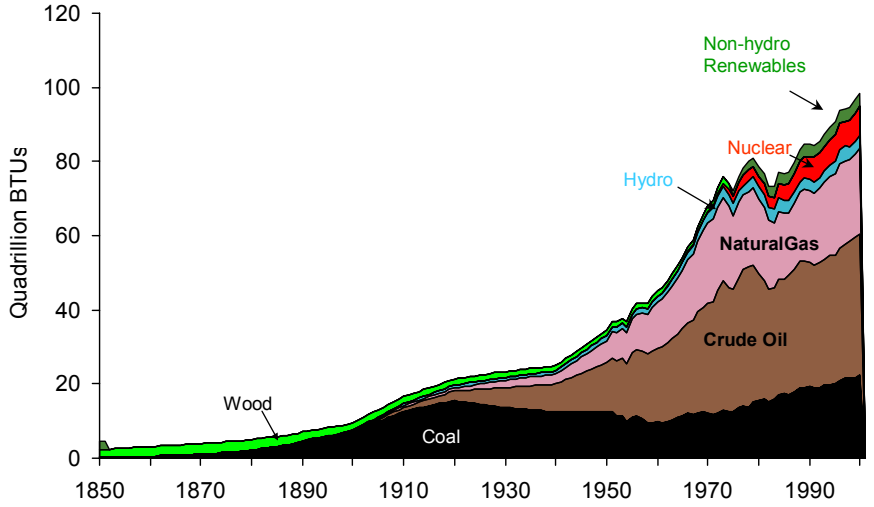
Bio-based Products

While all products made by Maine's forest products industry – lumber, paper, biomass electricity, and wood products – are rightly referred to as "bio-based products", for the purposes of this section, the term shall refer specifically to products derived through the chemical re-composition of woody biomass or byproduct (e.g. pulp mill sludge) into a new value-added material. This manufactured material may be a fuel, chemical, food additive, pharmaceutical, or other substance.

This section is not meant to serve as a definitive listing of potential bio-based products that could be produced in Maine, or to comment definitively on the economic and technical feasibility of producing particular bio-based products. The field of bio-based products is rapidly developing, and individual companies or research institutions hold as trade secrets much of the information on what is currently feasible. Instead, this section serves as an introduction to bio-based products and a discussion of some of the opportunities for and challenges to their development in Maine.

Energy consumption in the U.S. has grown dramatically over the last century, with fossil fuels such as coal, crude oil and natural gas providing the great bulk of the growth. With many predicting a peak in global oil production within the next twenty years, there may be an opportunity for bio-based products to replace fuel and other products that are currently derived from fossil fuels, or to capture growth in energy use.

Figure 93. U.S. Energy Consumption by Source, 1850 - 2000



Source: National Renewable Energy Laboratory

A growing number of academics, government officials, and businesses believe that bio-based products will provide a growing supply of fuel and chemicals. There are opportunities to build upon existing bio-based products (such as ethanol), and move existing or new products toward wood-based feedstocks.

Targets for a National Bio-Based Industry[134]

Bio-Product	2000	2020
• **Liquid Fuel**	1% – 2%	10%
• **Chemicals**	10%	25%

Proponents of bio-based products cite a number of benefits that make these products superior to traditional (generally petroleum-based) products, including[135]:

- Greenhouse gas reductions;
- Rural economic development;
- Security and diversity of energy supplies through use of domestically-sourced fuel;
- Use of a renewable resource;
- Urban air quality improvement; and
- Waste utilization.

These are all good and admirable reasons to pursue this technology. However, it must be remembered that from an investor's point of view, any new project must be economically sustainable – it must provide a level of profit acceptable to the investor.

Emerging Products and Technologies

There is enormous opportunity to make many bio-based products from wood-based material, but a number of hurdles – technical and economic – remain. Through the middle of the 1900's, it was not uncommon for paper mills to have large research and development departments that turned out a wide variety of products. The Brown Company in nearby Berlin, NH became famous for its ingenuity, and using wood developed products such as *Kreme Krisp*, a forerunner to today's commercial cooking shortening.

In recent decades, researchers have concentrated most of their efforts at developing better and less expensive production of existing forest products, while other industries – such as petroleum refining – have developed a wide variety of chemicals and fuels. That may be about to change. Through its *Agenda 2020* program, the nation's paper industry is

[134] Amidon, Thomas. "New Forest Based Materials Presentation." Forum on Bio-Products Development: Opportunities for the Forest Products Industry. March 2, 2004.
[135] Hogan, Ed. *The Pyrolysis Bio-refinery Concept for the Production of Green Fuels and Chemicals*. Bio-oil Briefing Workshop, Concord, New Hampshire. August 16, 2002.

seeking to leverage research and development into new products that enhance and support the paper industry.

The production of bio-products is based upon "breaking down complex carbohydrates (compounds of carbon, hydrogen and oxygen) into their component sugars – analogous to how petroleum refineries break down complex hydrocarbons (compounds of carbon and hydrogen) into simpler chemicals, which are then built back up into desired fuels, plastics and other chemicals."[136] The fundamental difference, of course, is that bio-products can be produced from renewable feedstocks. Wood and other plant material consists largely of cellulous (38-50%), hemicellulous (23-32%) and lignin (15-25%). Breaking these components down and reconstituting them in a consistent and cost-effective manner is the key to development of a meaningful bio-product industry.

Some advocates for bio-based products boldly proclaim that anything that can be made from petroleum can be made from wood or other bio-based feedstocks. This may well be true someday in the future, but today a number of technical and economic hurdles remain. Researchers now know that they can make ethanol from wood far more economically than in the past, and are moving forward on processes that will make this process competitive with other fuels from a cost perspective. The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) was recently recognized for developing a process that uses enzymes to turn cellulosic biomass (such as wood) into sugars – the base for chemicals and fuels. According to NREL, through this process "the cost of converting cellulosic biomass into usable sugars can be reduced by more than 20 times per gallon of ethanol produced."[137]

Products such as ethanol are attractive bio-based products because they have a known market, and known uses. While there would be some resistance from other (corn-based) ethanol producers and existing petroleum gas refiners, the product and its uses are established. For other products – many of which may not have developed markets and pricing -- one can expect a period of intense competition with other existing manufacturers, which will prove a serious challenge for a number of bio-based products. Opportunities are being initiated here in Maine that may position the state as a leader in some bio-product areas.

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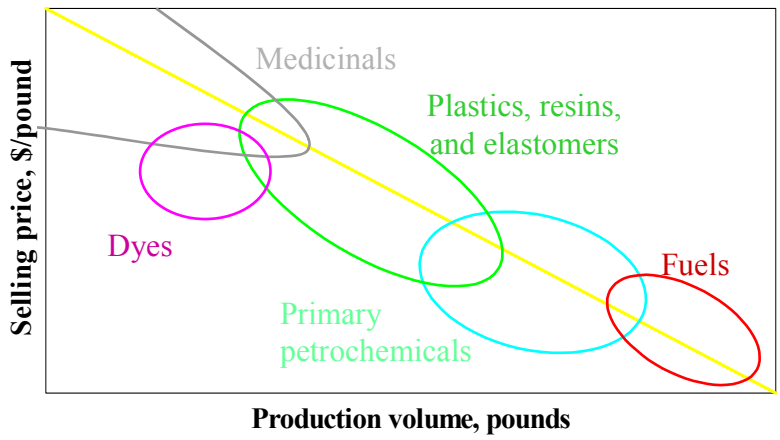
[136] National Renewable Energy Laboratory. *2003 Research Review.* April 2004.
[137] *SolarAccess.com.* "Biomass and Solar Technologies Lauded." July 16. 2004.

Products that may be derived from wood (through a number of different processes) include cellulose-based fibers, fatty acids (used as lubricants), specialty celluloses, sterols (used in pharmaceuticals), essential oils, vitamins, aldehydes, bioactive polyphenols, proanthocyanids (an anti-oxidant), and taxans (used in pharmaceuticals)[138]. The following figure shows classes and relative market / market price for a number of product types that can be derived from bio-products such as wood.

Figure 94. Selling price and market volume of bio-products[139].



Depending upon the feedstock (e.g., whole-tree chips, paper mill sludge, or sawmill residues) and process used, it may be possible or desirable to make more than one bio-based product or group of products at a given facility. In many cases, this may be economically necessary – the production of high volumes of a known product with a relatively stable market (e.g. ethanol) that allows a facility to get financing and operate while other, potentially higher-value, products are developed and brought to market -- may be the way bio-based products make a significant in-road into commercial production. Looking to the petroleum refining industry as a model, researchers have noted that:

> "Fuels are the main product of mature petroleum refining processes, and this is likely to be the case for a mature biomass refining industry as well. There are few

[138] Chornet, Esteban. "River Valley Pyrolysis Project." *Forum on Bio-Products Development: Opportunities for the Forest Products Industry*. March 2, 2004.
[139] Overend, Ralph P. "Biobased Products from Biomass Platforms." *Forum on Bio-Products Development: Opportunities for the Forest Products Industry*. March 2, 2004.

organic chemicals and polymers with markets large enough to serve as primary products for one full-sized biomass refinery, especially when no single facility can expect to command full market share."[140]

Developing the Bio-based Products Industry in Maine

Maine's forest products industry is well positioned to participate in and benefit from the development of a bio-based product industry. In Maine, there are essentially two models that could emerge:

1. **Stand-alone facility.** A facility could be developed to take in wood and produce chemicals, fuels, or both, using a number of processes. This could be a stand-alone greenfield (new) site, and would likely involve the production of a variety of products in order to provide economic diversity to the facility; or

2. **Co-location, or a move toward a "bio-refinery".** A facility that uses part of the input or waste stream from an existing forest product manufacturer could co-locate, providing both entities with benefits. An example of this would be an ethanol producer that used paper mill sludge as a feedstock locating at the site of an existing Maine paper mill.

Each of these approaches presents opportunities and challenges. The paper industry's *Agenda 2020* focuses on using existing infrastructure – pulp and paper mills – to improve the profitability of the existing paper industry and move toward a state where pulp and paper mills are the hub of a "bio-refinery" that produces a wide variety of products, including pulp, paper, fuels and chemicals.

As noted in a recent *Agenda 2020* publication:

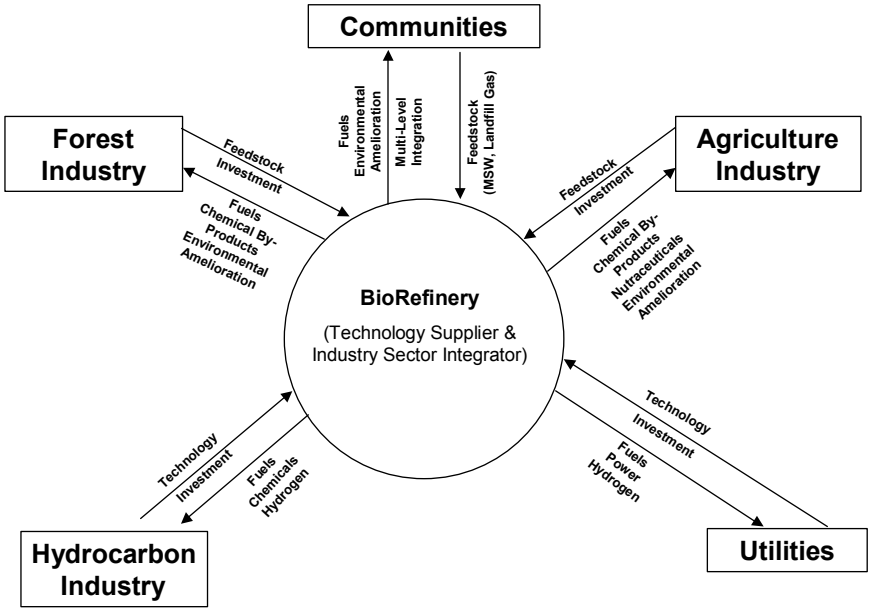
> "Advancing the Bio-Refinery: annual harvests from private forests in the U.S. is around 250 million dry tons of wood and bark. About 40 percent of this material is used for energy. Estimated 1990 energy yield from wood residues in the forest products industry alone was equivalent to 300 million barrels of oil worth $8.8 billion. Applying bio-refinery technology to creating new value streams will more than double this value by 2030 through systematic improvements in forest productivity and biomass conversion technology."[141]

[140] Lynd, Lee R., Charles Wyman, Mark Laser, Donald Johnson, Robert Landucci. *Strategic Biorefinery Analysis – Report 2: Analysis of Biorefineries.* Prepared for the National Renewable Energy Laboratory. November 2002.
[141] *Agenda 2020: Forest Products Industry Technology Alliance – 2003 Progress Report.* 2003.

There is research underway in the Northeast to extract value from fiber prior to pulping[142] and to derive new values from residuals[143]. There have been successes on a number of projects at the bench scale, and research is continuing to move these efforts toward commercial realization.

Eventually, this success in developing products compatible with pulp and paper production may move mills to a more complex and robust position, where they are producing a wide variety of products for a number of industries and yielding better overall profits.

Figure 95. Conceptual Bio-Refinery Schematic[144]



Researchers have noted that there are a number of significant advantages of pursuing a bio-refinery, as compared to production of a single product.[145]

- Revenues from high-value co-products may help reduce the selling price of the primary product, thus making it more competitive;

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[142] Amidon, Thomas. "New Forest Based Materials Presentation." *Forum on Bio-Products Development: Opportunities for the Forest Products Industry*. March 2, 2004.
[143] Lynd, Lee. "Biomass: Big Futures, Complementarity, & Next Steps." *Forum on Bio-Products Development: Opportunities for the Forest Products Industry*. March 2, 2004.
[144] Hogan, Ed. *The Pyrolysis Bio-refinery Concept for the Production of Green Fuels and Chemicals*. Bio-oil Briefing Workshop, Concord, New Hampshire. August 16, 2002.
[145] Lynd, Lee R., Charles Wyman, Mark Laser, Donald Johnson, Robert Landucci. *Strategic Biorefinery Analysis – Report 1: Review of Existing Refinery Examples*. Prepared for the National Renewable Energy Laboratory. November 2002.

- The economies of scale provided by a full-size biomass refinery lowers the processing costs of low-volume, high-value co-products;
- Biomass refineries maximize value generated from heterogeneous feedstock, making use of component fractions to produce a range of products; and
- Co-production can provide process integration benefits (i.e. meeting process energy requirements with electricity and steam co-generated from process residues).

Readers should note that the formation of a true "bio-refinery" is not expected in the near future. A number of technology and process hurdles must be addressed, and significant effort must be spent on deployment and commercialization, market development, and building the businesses to support these new products.

Moving Toward Commercialization in Maine

Moving bio-based products from concept to the lab to commercialization will prove challenging. Meeting these challenges will be necessary for development of a bio-products industry in Maine, and a realistic understanding of the challenges and opportunities that bio-products present will benefit all parties.

A wide variety of products can be made from wood and other bio-based material, and at some point in the future much of it will be made economically. This is likely a function not only of technology development, but of the price of the major input to most fuel and chemicals in production today – petroleum. If oil prices remain at current levels[146] or rise, the drive to develop and deploy bio-based products will be aided.

Maine has a vast supply of wood, often cited as a key bio-feedstock because of its year-round availability. While this is a strong benefit, Maine must remember that other regions have large quantities of wood available as well, and this may not serve as a significant competitive advantage. In fact, the wide variety of species available in Maine's forest presents both an opportunity (a large number of potential feedstocks) and a challenge (possibility of large volumes of "non-homogenous" feedstock with ever changing makeup).

Depending upon the process and product, feedstocks other than wood can be used to develop bio-based products. One firm that seeks to produce a "bio-oil" using the pyrolysis process has bench tested over fifty feedstocks, including the following that have no or negative input cost[147]:

- Corrugated cardboard;
- Corn hulls;
- Corn stover;
- Newsprint;

[146] $51.25 on February 25, 2005 on the NYMEX, down from a recent high of $55.17 a barrel on October 26, 2004.
[147] Dynamotive Energy Systems Corporation. *Bench Tested BioTherm Feedstocks.*

- Paper mill digested sludge;
- Rice hulls;
- Sugar cane bagasse;
- Wheat chaffe;
- Manure;
- Municipal Solid Waste; and
- Sewage sludge.

This company has focused its research and development efforts on wood, and to a lesser extent agricultural residues (e.g., sugar cane bagasse). However, even here Maine may face competitive challenges, as bio-based product companies may be focused first on those areas with low to negative cost feedstocks:

> "The Company [Dynamotive] plans to unleash significant amounts of energy production, in the form of BioOil fuels, based upon utilization of abundant biomass waste streams from agricultural and forest operations and other post-industrial biomass residues. In many cases the feedstock sources are costly to dispose of and therefore are available at zero cost or are potentially revenue generating to then convert into BioOil."[148]

Similarly, the federally-funded National Renewable Energy Laboratory is "evaluating low-cost, potentially high-yield renewable feedstocks – agricultural residues, mixed plastics, trap grease, textiles, and other organic materials in the post-consumer waste stream" for their use in hydrogen production and other applications[149]. Wood may prove preferable as a feedstock for a number of applications, but it is important to note that in many cases it may be a relatively expensive feedstock.

Commercialization of bio-products will be difficult, particularly within the paper industry. The industry generally has a lack of capital, a recent decline in technical entrepreneurship, and management that sees development of new product lines as outside of the core business. For these reasons, initial developers may be "over the fence" companies – firms that co-locate at an existing facility but have their own processes, staff, markets and financing.

New products, such as bio-based products, face a number of challenges. These include:

- Industrial acceptance (product risk profile),
- Competitive pricing to traditional products,
- Initial production and delivery hurdles,
- Lack of developed markets, and
- Intellectual property concerns.

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[148] Dynamotive Energy Systems Corporation. *Annual Report.* 2001
[149] National Renewable Energy Laboratory. *2003 Research Review.* April 2004.

Due to these challenges and the financial uncertainty that goes with them, bio-based products are often held to a high economic threshold. One observer has indicated that the "compelling deal criteria" (point at which an investor would fund a project) for a bio-product facility would include a projected return on investment of 35%[150] -- double to triple what is required in other sectors of the forest products industry.

Federal Incentives to Develop Bio-based Products

Recognizing the potential of the bio-based product industry to provide new products from American forests and farms, the federal government has been active in promoting industry development. Federal orders or statutes promoting bio-based product development include:

- Executive Order 13134, *Developing and Promoting Biobased Products and Bioenergy* (August 1999);
- *Biomass Research and Development Act* of 2000;
- *Farm Security and Rural Investment Act* of 2002 (2002 Farm Bill); and
- *Healthy Forest Restoration Act* of 2003.

Of particular interest, the 2002 Farm Bill initiated a "Federal Biobased Product Preferred Procurement Program" (referred to as the FB4P), which will provide for procurement preferences for bio-based products that meet certain standards. The rules for this program are in development at this time, and will designate federal purchasing preferences for products in the following categories:

- Adhesives
- Construction materials and composites
- Fibers, paper and packaging
- Fuels and fuel additives
- Inks
- Landscaping materials and composted livestock and crop residue
- Lubricants and functional fluids
- Paints and coatings
- Plastics – monomers and polymers
- Solvents and cleaners, and
- Absorbents and adsorbents

Because the federal government, through its many agencies, is a very large consumer of a wide variety of products, this procurement preference may provide a major opportunity for newly developed bio-based products to enter the market and establish a base of customers and applications. For forest products, it is important to note that the proposed rules specifically exclude products with established markets, including "wood products

[150] Amidon, Thomas. "New Forest Based Materials Presentation." *Forum on Bio-Products Development: Opportunities for the Forest Products Industry*. March 2, 2004.

made from traditionally harvested forest materials."[151] The federal government is also active in providing funding for increased research and development of bio-based products.

Case Study -- Opportunity Analysis of a Bio-Oil Facility in New Hampshire

In 2004, the New Hampshire Office of Energy & Planning commissioned a generic[152] feasibility study for a bio-oil facility in that state. This analysis was part of the state's effort to identify new markets for low-grade wood, and was conducted by Innovative Natural Resource Solutions LLC, with a Commercialization Plan conducted by Cole Hill Associates[153].

"Bio-oil" is an organic, liquid fuel produced through a process known as fast pyrolysis. Pyrolysis is a thermal process that rapidly heats biomass (such as wood) in an oxygen-free environment to a carefully controlled temperature, and then very quickly cools the volatile products formed during the reaction. This procedure produces three products: a liquid, char, and gas. The liquid, roughly 75% of the output, is referred to as "bio-oil".

Bio-oil can be burned to produce heat and electricity, and many see it as an intermediary to a number of higher-value chemicals, pharmaceuticals, and food additives. While some work has been conducted in this area, most of the chemicals that could be derived from bio-oil have not been isolated at the commercial level, and doing so may prove extremely challenging.

The analysis considers a variety of locations and economic variables in order to assess feasibility. All scenarios considered in the commercialization plan assume the generation and sale of electricity as a significant part of the project. Economic and other assumptions used in the Commercialization Plan support a conclusion that bio-oil production and marketing are feasible economically and environmentally under the circumstances specified. It must be noted that this conclusion is based upon a number of assumptions that have not been fully tested in the marketplace.

[151] *Federal Register* Volume 68, No. 244, December 19, 2003.
[152] This study did not identify a particular site for the facility, operator, management team or particular technology to be licensed.
[153] This complete analysis, including the feasibility study, commercialization plan, and supporting spreadsheets is available at the New Hampshire Office of Energy & Planning website, http://www.nh.gov/oep/programs/energy/bioOil.htm

Outlook

Maine's forest products industry may be well-positioned to benefit from the development of some new bio-based products. However, caution is necessary, as commercial success in this arena is easier said than done.

A number of factors favor an expansion of bio-based product development in Maine, including global momentum for bio-based energy and products, technology advances, and some existing infrastructure (e.g. some paper mills) that must identify new revenue sources in order to remain economically viable. If the intellectual property associated with development of new bio-products is adequately protected, this may serve as an area where Maine can develop a lasting competitive advantage.

There are two key pieces to moving toward development of commercially feasible bio-based products in Maine:

1. *Investing in R&D.* An enormous amount of work remains to be done in the vast field of bio-products, and this will happen best if public and private sector investment is made to solve some of the technical challenges that exist for turning wood fiber and wood manufacturing residues into value-added products; and

2. *Encouraging a rapid deployment of new technologies.* Once new technologies are developed, Maine should work with companies to rapidly bring the product to commercial applications. As noted in the paper industry's *Agenda 2020* publication, "cutting edge research is worthless if it's not swiftly deployed."[154]

Maine is fortunate to have two organizations that recognize the potential of bio-based products in Maine and are working toward development of centers where continued research, development and deployment can be undertaken. The University of Maine, with its world-class research faculty in paper, chemical engineering, and wood composites – as well as the presence of a pilot paper machine – has great promise as a leading developer of new technologies[155]. Additionally, the River Valley Growth Council, a community-based economic development corporation in Rumford, has been working to establish a bio-development product center at that location. Maine recently received nearly $1 million in grants from the U.S. Department of Energy for forest-based bio-product research and development, seeking to "establish forest biomass as a significant source of sustainable fuels, heat, power, chemicals and materials."[156]

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[154] Moore, Henson. In *Agenda 2020: Forest Products Industry Technology Alliance – 2003 Progress Report.* 2003.
[155] Goad, Meredith. "Scientists mix chemistry, eco-safety, find solutions." *Portland Press Herald.* October 26, 2004.
[156] *Portland Press Herald*. "Federal grants support forest bio-products research." September 22, 2004.

SURVEY OF MAINE FOREST PRODUCT MANUFACTURERS

Survey of Maine Forest Product Manufacturers

Description of Survey

In order to solicit information and input from broad range of Maine forest industries, Innovative Natural Resource Solutions LLC (INRS) conducted a survey of Maine forest industries. A copy of the survey (including a signed cover letter, self-addressed stamped envelope, and a response card) was sent to 110 forest products companies in April 2004. The list included pulp mills, sawmills, secondary wood product companies and wood energy facilities, and was provided by the Maine Forest Service for purposes of this survey. INRS recognizes that the list used is not a complete inventory of each and every forest industry company in the state of Maine, but believes that the list represents a fair sampling of the range of Maine forest industries. A second survey (the same survey instrument including a signed cover letter, self-addressed stamped envelope and response card) was mailed in May 2004 to firms that had not responded to the initial mailing.

The survey was anonymous, allowing companies to share information without concern that competitors or others would use information provided by a company. The survey itself did not ask companies to identify themselves, but a separate response card (which could be mailed apart from the survey) was enclosed. Respondents were encouraged to send in the card so that INRS could track survey participants, and a $100 gift certificate to L.L. Bean was raffled to one respondent, drawn at random.

A copy of the survey and the cover letter from the first mailing are included in Appendix C of this report.

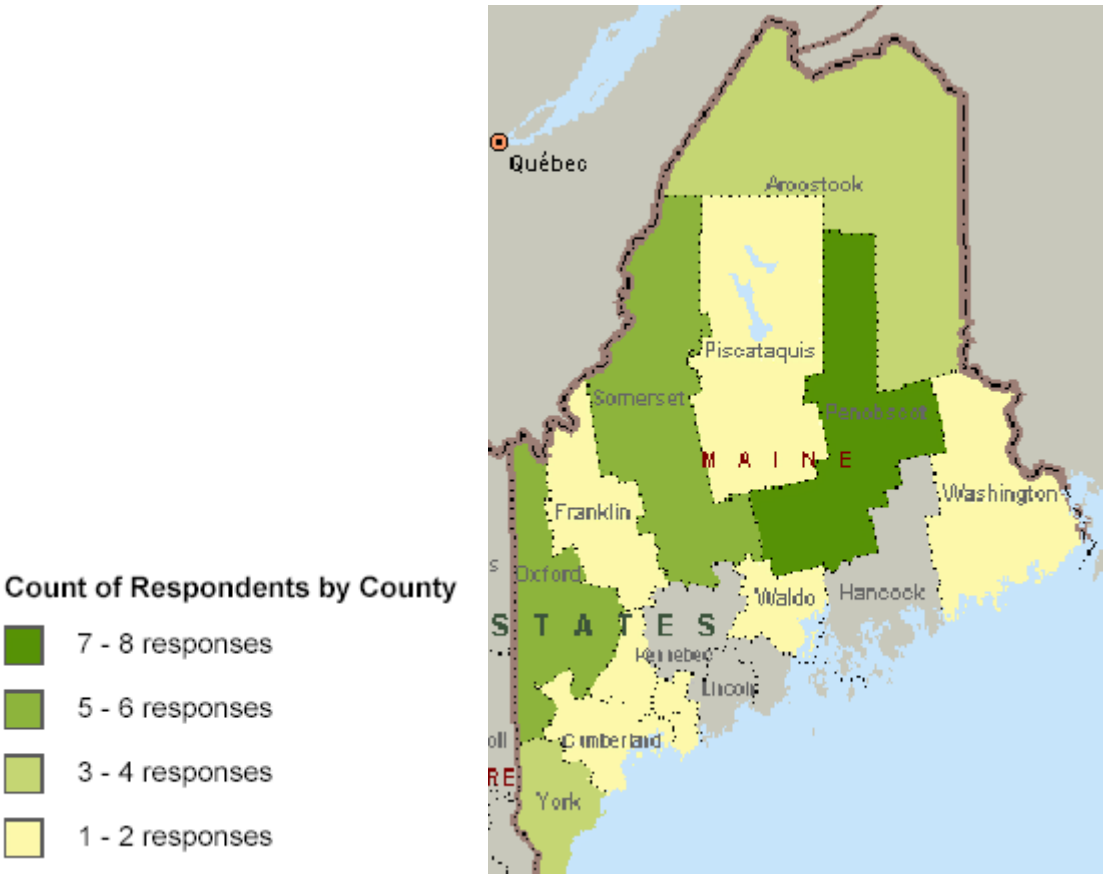
Survey Respondents

Following the two mailings, a total of 49 responses were received, for a response rate of 45%. Thirty-seven respondents sent in response cards identifying themselves (76% of all respondents), but in order to maintain confidentiality, these identifications could not be associated with a particular survey. Survey respondents included sawmills (hardwood and softwood), secondary wood product manufacturers, pulp and paper mills, wood-energy facilities, and manufacturers of engineered wood products.

Survey respondents were well-distributed throughout the state, with responses being received from the far northern and far southern portions of the state. The county with the largest number of identified responses was Penobscot, with eight.

The map below indicates the geographic distribution of known survey respondents (As noted above, INRS does not know the exact identity of 12 respondents; for this reason those respondents are not identified geographically.)

Figure 96. Geographic distribution of known survey respondents.



Survey Results

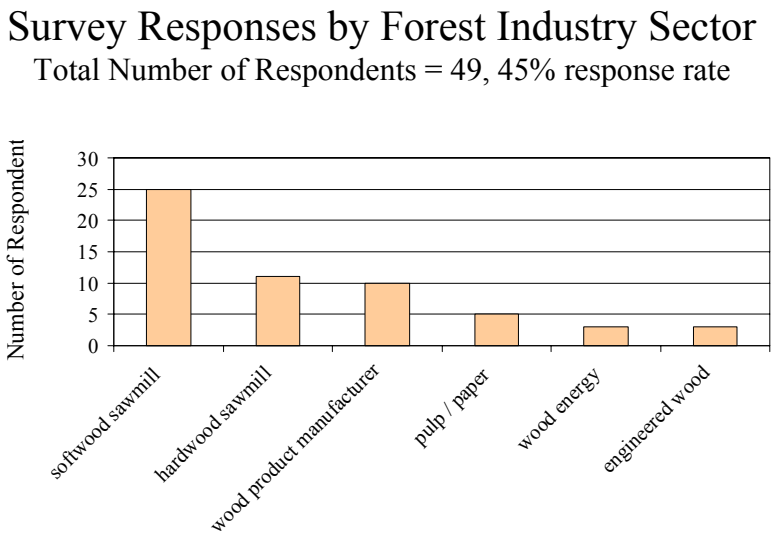
The following information describes the responses received from this survey. It should be noted that not all respondents answered every question. Additionally, three individuals who were not targets of this survey responded (i.e., a logging contractor and two landowners). As the issues these sectors face are different than the survey targets, these raw responses were not included in the data set. However, responses to open-ended questions from these surveys were included when they addressed the issues at hand.

Demographic

The 49 mills that responded employ a total of 6,680 employees. The mean number of employees per respondent is 134; the median is 36 employees (the median reflects that a few very large employers responded to the survey).

Survey responses were received from all sectors of Maine's forest industry, with the greatest number of responses (25) coming from softwood sawmills, and the smallest number of responses coming from engineered wood and wood energy facilities. This is not unexpected, as Maine has more softwood sawmills (by number) than engineered wood or wood energy facilities.

Figure 97. Survey Responses by Forest Industry Sector



Note: Some respondents are in more than one category, so columns total to more than 49

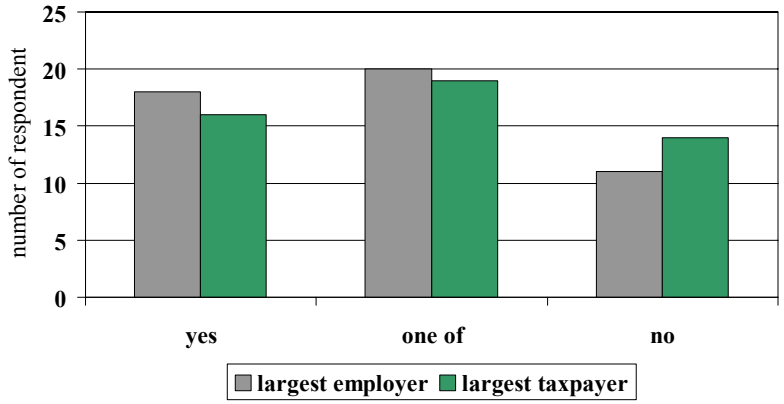
As seen below, when viewed by employees, the largest response came from the pulp and paper industry. This is expected, as these facilities tend to be very large employers.

Figure 98. Total, Average and Median Employees for Respondents by Sector

	Employees		
	Total	Average	Median
Softwood Sawmill	2,589	111	24
Hardwood Sawmill	505	46	23
Wood Products	210	35	38
Pulp & Paper	2,980	745	800
Wood Energy	32	16	16
Engineered Wood	364	121	114
All Respondents	6,680	134	36

Forest industries remain a critical part of Maine's rural economy, and many of the industries that responded to the survey are either the largest or one of the largest employers and taxpayers in their community. Of the survey respondents, 78% are either the largest or one of the largest single employers in their community, and 71% are either the largest or one of the largest single taxpayers in their host community.

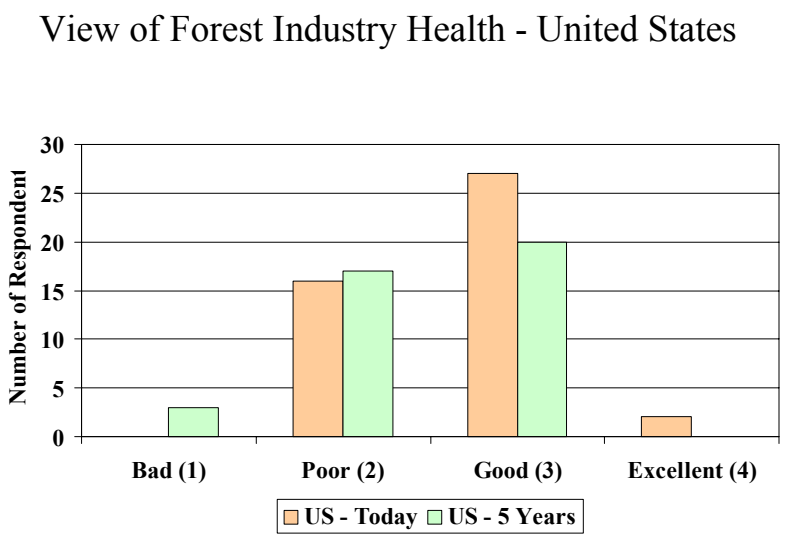
Figure 99. Forest Industries as Employers and Taxpayers in Maine Communities



Perception of industry health

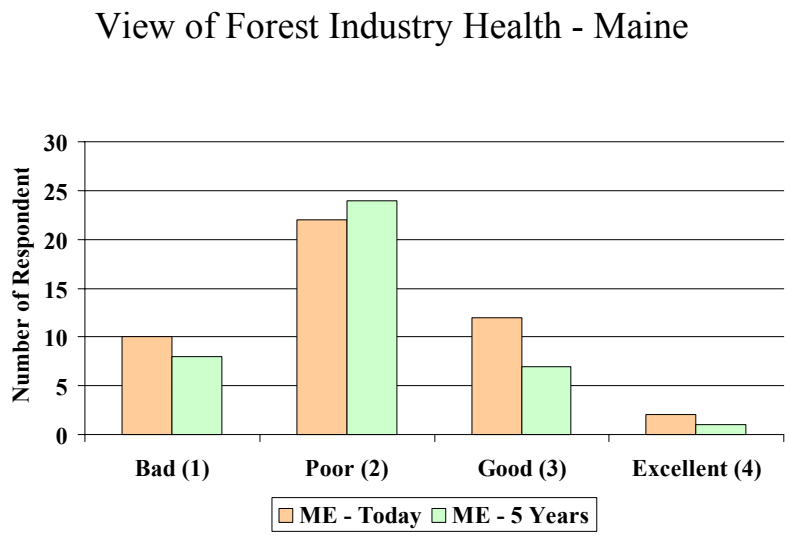
As a key component of the survey, respondents were asked about their perception of forest industry health, both today and in five years. This question was asked for the forest industry in the entire United States and in Maine specifically. The average respondent indicated that they view industry health nationwide as good (2.7), but are not optimistic that this will be the case five years from now (2.4).

Figure 100. View of Forest Industry Health in the United States



In contrast to the current view of the U.S. forest industry, the average respondent indicated that they view the current health of Maine's forest industry as poor (2.1), and on average do not see this changing in five years (2.0).

Figure 101. View of Forest Industry Health - Maine



Responses were similar when respondents were asked about their view of the health of their sector.

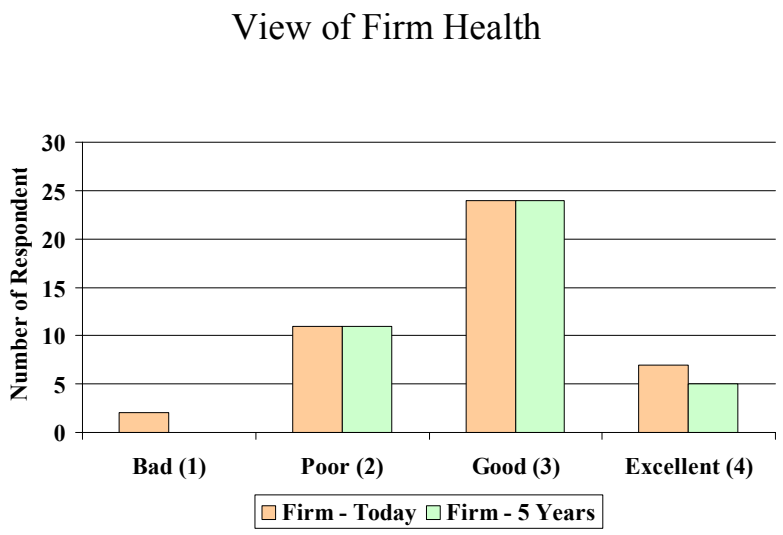
Figure 102. Respondent View of Forest Industry Health

		Number of Responses				
		Bad (1)	Poor (2)	Good (3)	Excellent (4)	Average
Today	Industry - US	0	16	27	2	2.7
	Industry - ME	10	22	12	2	2.1
	Sector - US	0	18	22	1	2.6
	Sector - ME	11	20	11	1	2.0
	Firm	2	11	24	7	2.8
5 Years	Industry - US	3	17	20	0	2.4
	Industry - ME	8	24	7	1	2.0
	Sector - US	3	15	17	1	2.4
	Sector - ME	8	22	7	0	2.0
	Firm	0	11	24	5	2.9

Interestingly, the average respondent's viewed their firm's current health as better than the national or state average (2.8), and were slightly optimistic about the future health of their firm (2.9). There are a number of possible explanations for this, including:

- The firms that responded to the survey may, on average, be in better financial health than the industry as a whole, either nationally or in Maine;
- It is possible that respondents self-selected, and those in good financial health were more likely to complete and return the survey; or
- Those that completed the survey are quite familiar with the finances and plans of their individual firm, but are not as aware of the finances and plans of others in the industry.

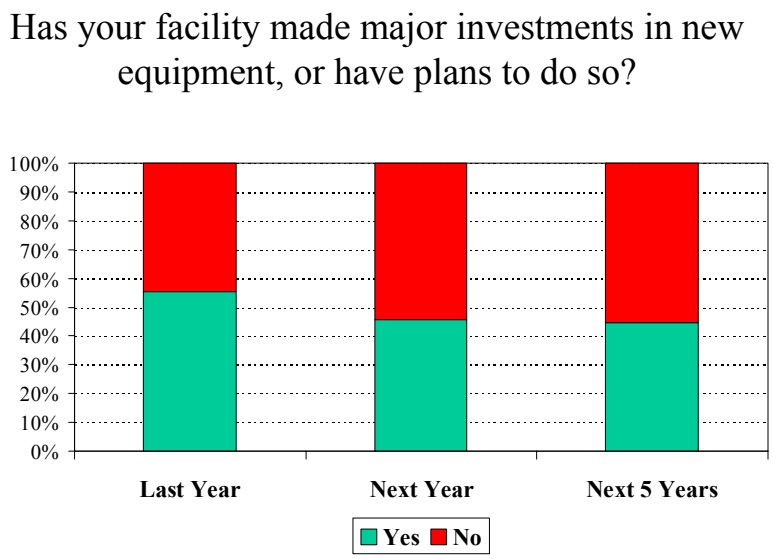
Figure 103. View of Firm Health



Investments and Investment plans

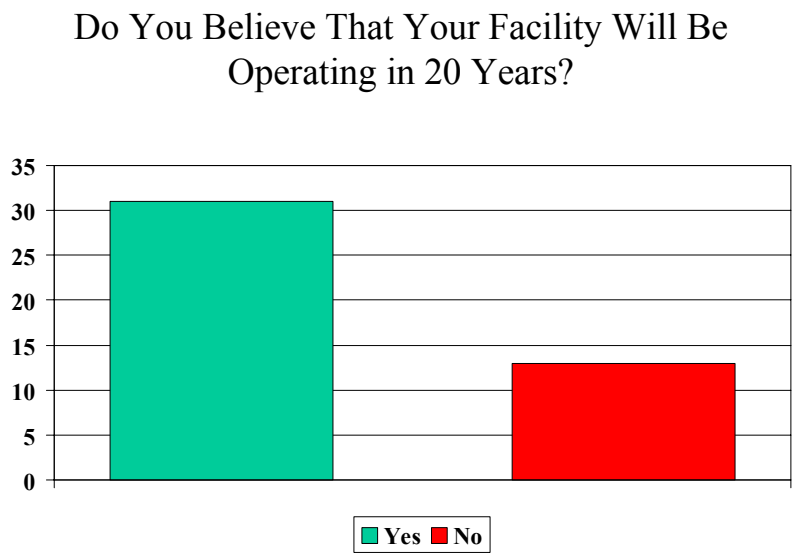
In order to survive and prosper in the increasingly competitive global marketplace, Maine firms have been investing, and continue to invest in their operations. Survey respondents were asked if they had made, and intended to make "major investments in new equipment" (the level of "major investment" was not defined). In an encouraging sign, over half of the respondents have made investments in the past year. However, the number of firms that plan investments in the next year or five years is less than half, a response that should be of significant concern to the State and the industry.

Figure 104. Major Investments in New Equipment



Firms were asked whether they believe that their facility would be operating in twenty years. INRS recognizes that this is a long time horizon, but this provides a good indication of the long-term outlook of a respondent. Seventy percent of the respondents believe that their facility will be operating in twenty years, a sign of confidence in continued strength of Maine's forest economy. However, thirty percent of the facilities indicated that they do not see themselves in operation in twenty years. Maine should recognize this as a warning that there are concerns about the long-term prospects of some forest companies, and should take action to make the climate one in which both the State and forest industries are responsive to changes in the marketplace.

Figure 105. Long-term Confidence in Continued Operation



Programs available to the forest industry

Maine has a number of business assistance programs available to forest industries (as well as other industries). In an effort to gauge how well forest industries know these programs, and to determine whether forest industry perceives these programs as meeting their needs, respondents were asked about their awareness of four programs, and whether they perceived these programs fit their needs:

- **FAME** – The Finance Authority of Maine. FAME is an independent state agency that (along with other responsibilities) develops and administers programs related to the financing of business in the State of Maine. FAME offers a wide range of financial products for start-ups, growing firms and established companies, and can be found at www.famemaine.com;

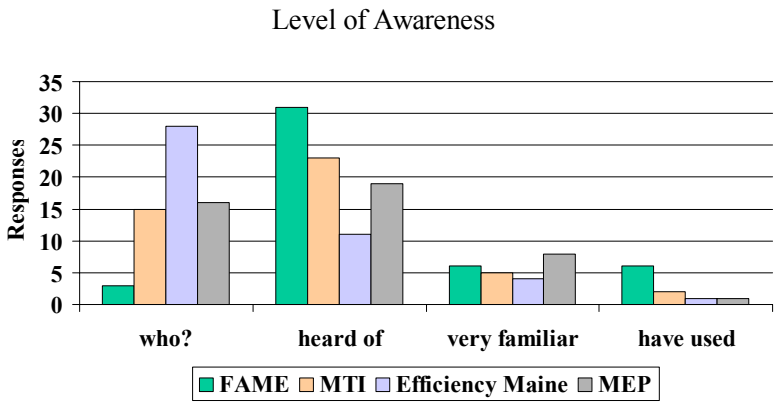
- **MTI** – The Maine Technology Institute. MTI, which provided funding for this project, is a non-profit organization created to encourage, promote, stimulate and support research and development activity leading to commercialization of new products and services in the State's technology intensive sectors. One of MTI's focus areas is the forest industry, and information can be found at www.mainetechnology.org;

- **Efficiency Maine** – Efficiency Maine is a statewide effort to: promote the more efficient use of electricity; help Maine residents and businesses reduce energy costs; and improve Maine's environment. Efficiency Maine is funded by electricity consumers and administered by the Maine Public Utilities Commission, and includes programs to help industries invest in energy efficient equipment. More information can be found at www.efficiencymaine.com;

- **Maine MEP** – The Manufacturing Extension Partnership – is a non-profit service available to every manufacturer in the state to help them compete more effectively in the global marketplace. Improved efficiency, elimination of waste, international certifications, integration into global supply chains and networking Maine businesses with the resources they need to become more profitable, and increased sales are among the benefits of working with the Maine MEP. More information on Maine MEP can be found at www.mainemep.org.

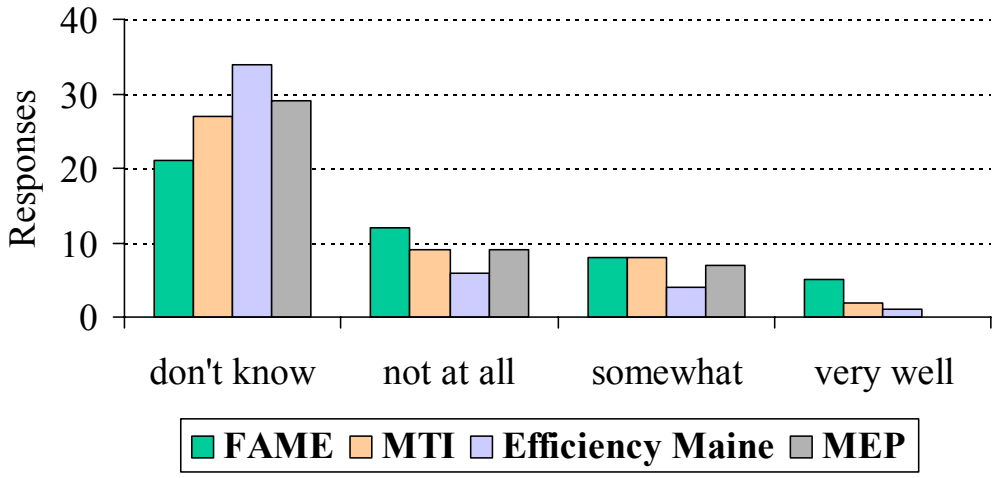
In the survey, we learned that most respondents were not familiar with these four programs, with *at least* seventy percent of respondents indicating that they did not know of, or have only heard of, these programs.

Figure 106. Industry Awareness of Business Assistance Programs & Organizations



In addition to knowing little about these four programs, companies either don't know if the programs and services offered fit their needs, or have concluded that they do not. While it may be true that some organizations or programs do not offer products that meet the needs of forest industry, it is surprising to find that, with the exception of FAME, over half of the respondents did not know whether these programs fit their needs. This clearly points to a need to connect forest industries to programs that exist. In addition to the four programs surveyed, Maine offers a number of other programs to companies; there is no reason to believe that other programs have greater awareness levels.

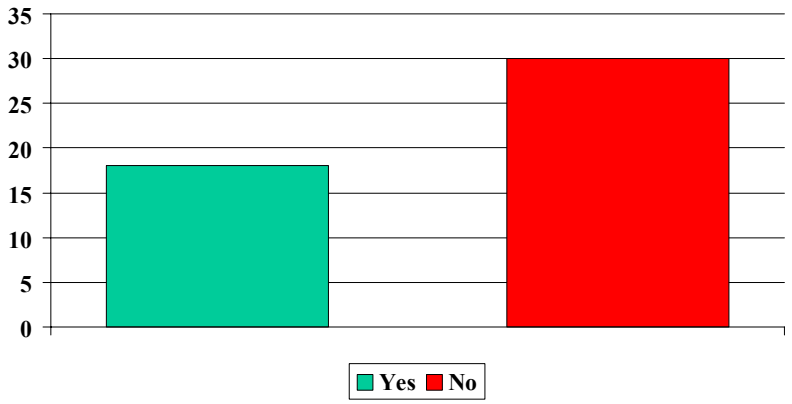
Figure 107. Industry Belief that Organizations / Programs Meet Their Needs.



Doing business in Maine

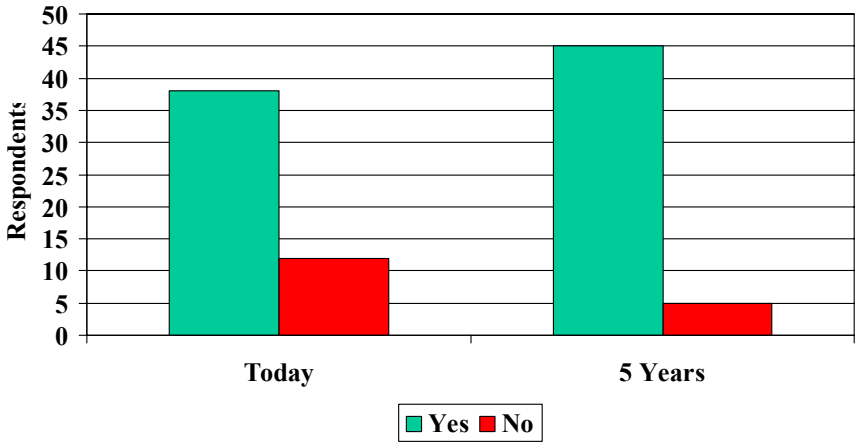
Respondents were asked whether they would consider siting a new forest industry operation in Maine, assuming necessary resource availability. Sixty-two percent indicated they would not; thirty-eight percent indicated that they would. For those that would not, they were asked where else they would look to locate a new facility. Responses included New Hampshire (13), Canada (11), Offshore (6), and the U.S. South (3). It is clear that many respondents believe that that they would be more successful in these areas than they are in Maine.

Figure 108. Number of Respondents Who Would Consider A New Facility in Maine.



Maine forest industries also report that they have trouble finding qualified workers, and expect that this issue will grow in the next five years. The average respondent indicated that the last time they hired someone was roughly four months ago; the average layoff was almost three years ago. It should be noted that firms that have closed are not part of this survey, and thus the layoff response may be misleading industry-wide. Maine forest industries estimate that the average age of their employees is 40.

Figure 109. Respondents Indicating They Have Trouble Finding Qualified Workers

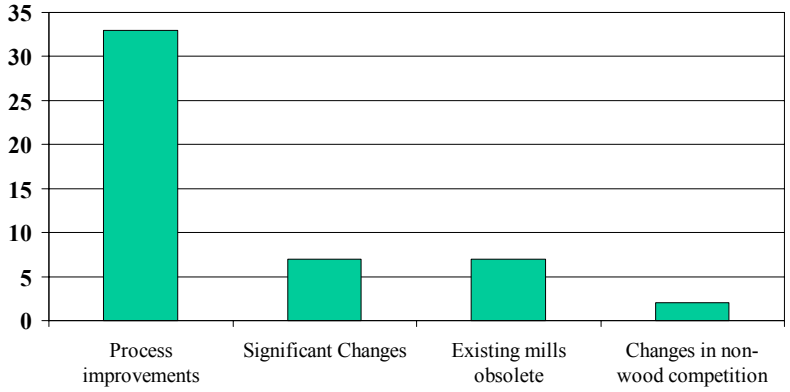


Technology Issues

The investment in and implementation of new technology has been, and will continue to be, an important part of the success of Maine's forest industry. Given the role that increased productivity and new product development may play in the future, respondents were asked several questions regarding their perspective on adopting new technology.

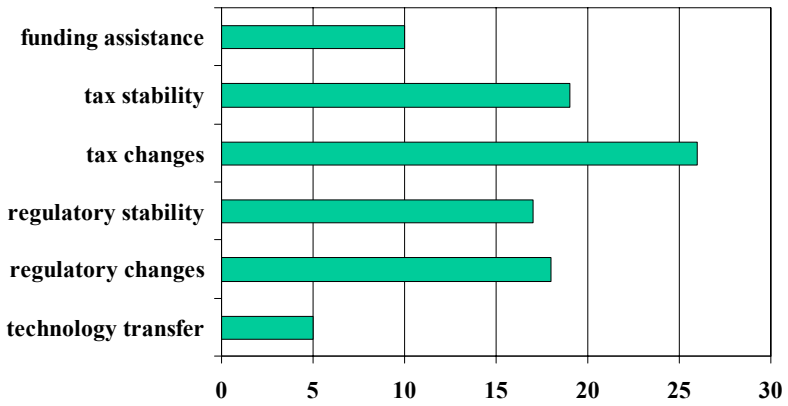
Most respondents (67%) see process improvement (e.g., technological changes that increase productivity in an incremental fashion) as the role of technology in their sector over the next decade. Some respondents (14%) see changes so significant that existing facilities will be obsolete, and a very small number (4%) believe that changes in the technology used by non-wood competitors will see significant changes, causing problems for Maine's forest industry.

Figure 110. Perspective on Technology Changes in the Next Decade



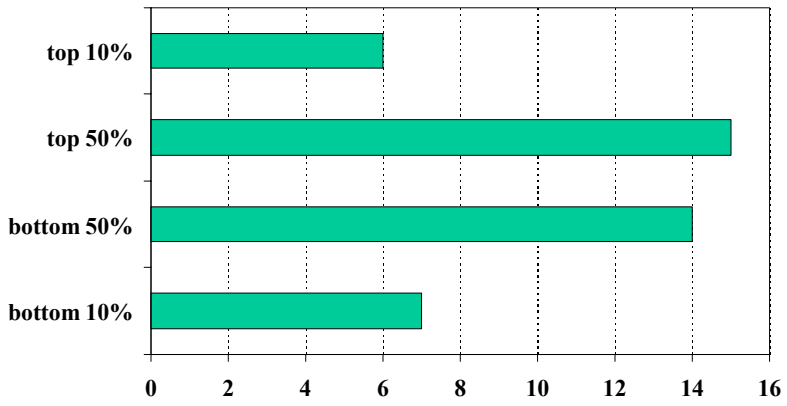
Recognizing that many Maine forest industries -- across all sectors -- will need to make continued investments in technology, respondents were asked what Maine could do to encourage investment. The largest number of respondents indicated that tax changes would encourage technology investment, with tax stability, regulatory changes and regulatory stability also frequently cited. Technology transfer (getting information to mills) was the least frequently cited thing that Maine could do to encourage investment.

Figure 111. Respondent View of How Maine Could Encourage Technology Investment



Respondents were asked where they view their facility in technology investments over the last five to ten years, when compared to global competitors. The response could be characterized as normal distribution, with most respondents saying they were in the top fifty percent (36%) or bottom fifty percent (33%) of technology investment globally. Fourteen percent of respondents see themselves in the top 10% of technology investment, and seventeen percent see themselves in the bottom 10%.

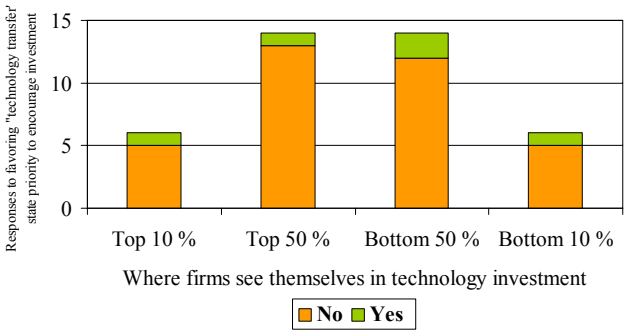
Figure 112. Respondent Perception of Firm's Technology Investment in Last 5 – 10 Years



In an effort to gauge whether past technology investment influenced a firm's valuation of technology transfer, responses were grouped to show which firms, by technology investment, value technology transfer. There does not appear to be a relationship between the two.

Figure 113. Technology Investment and Technology Transfer

A firm's perception of where it stands in new technology does not appear to influence its desire to have "technology transfer" as a priority for state efforts.



Open-Ended Questions

Firms were asked a series of open-ended questions. A complete listing of survey responses follows. *It should be noted that the opinions expressed are those of the survey respondents, and do not necessarily reflect the opinions of INRS or findings elsewhere in this report.* INRS has attempted to group and summarize responses, but readers are encouraged to read all responses in order to best understand the range of comments and suggestions received.

Respondents were asked what is the most important thing Maine could do to help the long-term competitive position of the forest industry. In a subjective grouping, the largest number of respondents (16) expressed desire to see a change in the business climate of the state. A number of respondents (7) also encouraged actions that would directly support good forestry, and five expressed a desire to see an attitude in state government that values forest industry. Other responses encouraged state government to not interact with the forest products industry, repeal recently passed regulations dealing with liquidation harvesting and collective bargaining, and encouraged change in international trade policy.

When asked what the industry could do to help its own long-term competitive position, the largest number (9) indicated that investment in new technology was critical to the industry's future competitiveness. A number of respondents encouraged the industry to encourage improved forest management (7) or work together to have an impact on political issues (7).

When asked what would encourage increased investment in their facilities, respondents overwhelmingly (15) indicated some type of change in the business or tax climate of Maine. Also important for encouraging future investment is confidence in the future supply of raw materials (5) and confidence in markets or profits (5).

When asked what would help employers find, train and keep workers, seven respondents suggested changes to the educational system, and seven suggested that if they could pay more (or offer better benefits), they would be better able to hire and retain employees. Five noted that changes to the state's social welfare system would increase the workforce, and a number noted that work in the forest industry is physically demanding, and many workers are not willing to meet these demands.

Respondents were asked who they would contact if they had a problem with Maine state government. Interestingly, the largest number of respondents (16) indicated that they would contact their local legislator, while the next largest number (6) indicated that they did not know who to call. This points to a need to make certain that legislators are aware of efforts and programs to help the Maine forest industry, and also points to a need for state agencies to better connect with the state's forest products industry.

Responses to Open-Ended Questions

The following are the questions asked and responses received to the open-ended questions asked in the survey, along with a description of the respondent.

Question 24 -- What is the most important thing Maine state government could do to help forest industries long-term competitive position? Why (please be as specific as possible).

- Stabilize the business climate (wood product manufacturer, <20 employees)
    - Insurance
    - Taxes
    - Regulations
    - Healthcare
- Stop passing forest regulations – forest practices act, liquidation harvesting, collective bargaining for independent contractors – all send messages that Maine is NOT an industry-friendly state. We have sent a negative message to employers and mills not to invest in Maine. (Pulp & paper facility, >100 employees)
    - Remove taxes on equipment
    - Lessen the impact of workers comp
- Stable tax policy that encourages investment. Regulatory environment similar to other paper producing states (i.e. less regulation) (pulp & paper facility, >100 employees)
- Stay out of it. (Wood product manufacturer, 20 - 50 employees)
- Stop logs from going to Canada. (Hardwood sawmill, 51 - 100 employees)
- Stop buying land. (Softwood sawmill, <20 employees)
- Reduce overall taxes. (Softwood sawmill, 51 - 100 employees)
    - Expand / continue incentive programs BETR, TIF, etc.
    - Faster regulatory process, permitting
    - Create pro-business attitude, climate
- The entire health of our forest products industry rests with the health and competitiveness of our paper mills. The majority are very outdated. Without solid, good paying pulp markets our landowners, cutters and truckers cannot earn a reasonable return on their investment and there will be no sawlogs for sawmills. If the paper mills continue to decline, the highest value for landowners will be to sell to out-of-state environmentalists and will take land out of forest products production. (Softwood sawmill, 20 - 50 employees)
- Some sort of limit on health care costs – out of pocket as well as hidden costs. (Softwood sawmill, <20 employees)
- Promote forest certification for medium-size landowners. Why? – Market share. Reduce the tax and regulatory burden. Reduce electrical costs.
- Give tax break to landowners growing timber for the future. (hardwood sawmill and wood product manufacturer, >100 employees)

- Have a change in attitude towards the industry. Despite all the contributions the industry makes it appears that we are often in conflict at the legislature or with the bureaucracy. (Softwood sawmill, 51 - 100 employees)
- Wood costs are too high compared to other states; lack of workers to cut the logs. (Engineered wood facility, >100 employees)
- Tax imports, and be more business friendly. (Softwood sawmill, 20 - 50 employees)
- Lower taxes, lower welfare programs so there will be incentive to work low-paying jobs, foreign trade with China's work force being cheap, less regulations. (Hardwood sawmill, <20 employees)
- No National Park. Allow foresters to manage the forest lands as they have been trained to do. Support sustainable forestry practices to ensure that the wood needs of the Forest Products Industry are available into the future. (Engineered wood facility, >100 employees)
- Resign and let some businessmen get in there and run this state like it should be. (Wood product manufacturer, 20 - 50 employees)
- Recognize the forest industry *as an industry* it (the government) wants as a part of the Maine economy. (Softwood sawmill, 20 - 50 employees)
- Listen more – dictate less. This administration has too many pre-conceived beliefs. Has too few appointed officials that know the forestry business. Stop thinking that only government has the answers.
- Don't drop BETR tax [refund]. Reduce taxation and continue to improve regulatory environment. (Softwood sawmill, >100 employees)
- Keep forestland open to harvesting without timber reducing restrictions. (Wood product manufacturer, 20 - 50 employees)
- Stay out of it – make things worse. They have no one qualified. (Hardwood sawmill, <20 employees)
- Stay out of our business affairs. It isn't possible to legislate or make a rule for every little problem out there. (Hardwood sawmill, 20 -50 employees)
- Reduce regulatory agencies from enforcement to partnership. It is painfully obvious that Maine's solution to budget deficit is in enforcement and penalties to industry.
- Support the idea of processing all available forest products (logs) in Maine. This will increase our manufacturing industry and provide jobs for Maine workers and tax dollars. (Softwood sawmill, 51-100 employees)
- My perception of the legislature is that they feel the forest products industry and manufacturing industry is not important, and grandstand about how big corporations are hurting the workers of Maine, but they are driving business out of the state through excessive taxes, regulatory constraints, etc. We are hurting employees more by forcing business out of the state. Specifically, our industry concerns are aggravated by talk of a Northern Maine National Park, excessive logging regulations, etc. I think some of the logging regulations were probably necessary, but we have forced little operations out of business. (Hardwood sawmill, 20 - 50 employees)

- Creative incentives that would help in foreign competition. (Engineered wood facility, 20 - 50 employees)
- We see little price elasticity…raw stock (turning squares) continue to go up but we can't push it through to customers. Actions that would help smaller sawmills stay in business would help overall prices and help stabilize prices. This goes to cost of doing business in the state…taxes, healthcare, workers comp, etc. (Wood product manufacturer, 20 - 50 employees)
- Most farmers have state aid when having bad years. Why can't small sawmills or businesses have help in environmental aid such as getting rid of wood waste, sawdust, and bark. (Hardwood sawmill, <20 employees)
- You can't. The Pacific Rim will do us all in. The whole country. Start cutting back on state overhead to get ready for it. (Softwood sawmill, 20 -50 employees)
- Find a way to get electrical costs and costs of doing business on par with Canada. They are experts at exploiting their resources. Hydro, forest products. (Hardwood sawmill, <20 employees)
- Allow economic forces to work. The state is putting money in old mills which will not survive, and this is putting pressure on remaining mills for the resource and putting them in jeopardy
- Reduce taxes, reduce workers compensation rates, and reduce health care costs. Cost of doing business in Maine is extremely high. Difficult to be competitive. (Softwood sawmill, >100 employees)
- The most important thing Maine state government could do to help the forest industry is to give as many advantages to small woods contractors as they can. Help them with tax benefits and help them communicate with FAME, EMDC and USDA, for all the assistance available. (Softwood sawmill, <20 employees)
- Reduce regulation (hardwood sawmill, >100 employees). Examples:
    - New liquidation harvesting regulations rather than enforcement and education of existing laws
    - Encourage renewable energy sources and give them a competitive advantage
    - Fund a marketing sector similar to Canadian Provinces
    - Stay out of labor negotiations
- They have to make it more attractive to operate within the state -- such as taxes, mandates and other issues – that drive up the cost of doing business. (Wood product manufacturer, 20 - 50 employees)
- Reduce all the cutting regulations. (Softwood sawmill, <20 employees)
- Reduce taxes, stop the exportation of logs to Quebec, and get workers compensation back under control. Why? – To lower costs. Eliminate the RESTORE issue once and for all. (Softwood sawmill, >100 employees)
- Sustainable policies, especially on forestry and the environment. Incent landowners to grow more wood to support regional industrial base. (Pulp & paper facility, >100 employees)

- Stop passing laws that restrict the ease of doing business in Maine. (Softwood sawmill, >100 employees)
- Stop clearcutting. (Wood product manufacturer, 20 - 50 employees)
- Get more actively involved in enforcing all regulations. The regulations and mandates are there, but there is very little monitoring of them to make much difference. (Pulp & paper facility, >100 employees)
- Reduce worker's comp rates. (Softwood sawmill, <20 employees)
- Relax on the environmental issues. Plus make permits easier to obtain. (Softwood sawmill, <20 employees)
- Regulatory standpoint – continually make it more difficult to operate. Government should let market conditions do its thing, instead of passing laws it has no business in (e.g. collective bargaining bill). (Pulp and paper facility, >100 employees)

Question 25 -- What is the most important thing Maine forest industry could do to help its long-term competitive position? Why (please be as specific as possible).

- Convince the general public that our industry is important and necessary. (Wood product manufacturer, <20 employees)
- Markets dictate where money is spent. We have to compete for capital against several other states – it cost considerably more to operate in Maine (pulp & paper facility, >100 employees)
- Invest in new equipment. (Pulp & paper facility, >100 employees)
- Vote the government out. (Wood product manufacturer, 20 - 50 employees)
- The legislature must stop tinkering the harvesting process and create stability in the industry. Talk of a park, land sales, taking more wood out of productions further erodes confidence and stability in this industry. (Softwood sawmill, 50 - 100 employees)
- Find ways to encourage pulp and paper company to invest in Maine. (Softwood sawmill, 20 - 50 employees)
- Better forestry (hardwood sawmill and wood product manufacturer, >100 employees)
- Organize an effective campaign to get our message to the public that the business climate is not allowing Maine companies to be competitive. Continuously reacting to mill closures (Great Northern, Lincoln Pulp & Paper) is not a viable solution. (Softwood sawmill, 50 - 100 employees)
- Bring in more Canadian loggers. The people in Maine don't want to work. (Engineered wood facility, >100 employees)
- Work to get comp down, work on state tax structure. (Softwood sawmill, 20 - 50 employees)
- Stop liquidation harvesting on private wood lots and subdivisions of large tracks of woodland. Harvest for the future. (Hardwood sawmill, <20 employees)
- Use sustainable forestry practices to promote a healthy forest. Raw material is where it stands. (Engineered wood facility, >100 employees)

- Wait for the businessmen and vote. (Wood product manufacturer, 20 - 50 employees)
- I think the industry is willing to compete, it just faces a lot of structural problems, globally, that are beyond its control.
- Identify markets it can continue to be competitive in. (Softwood sawmill, 20 - 50 employees)
- Create a friendlier government – pro-business legislature and administration must be put in place. Industry needs to get more involved in electing good candidates.
- Forest industry could invest capital to reduce operating costs and maintain competitive position if state government was more business friendly. (Softwood sawmill, >100 employees)
- Group together to form health self-insurance group. (Wood product manufacturer, 20 - 50 employees)
- Wake up and stop overseas market. (Hardwood sawmill, <20 employees)
- Invest in technology and training. (Hardwood sawmill, 20 -50 employees)
- Reduce load limits on interstate
- Work together to support Maine companies first. Reduce or completely stop exporting raw material (logs.) (Softwood sawmill, 51-100 employees)
- Continue to re-invest in our businesses to keep the best technology that produces max yield with minimum labor. You hear lots of complaints about Canadians hurting our competitive edge, but they have some of the most high-tech mills in North America. (Hardwood sawmill, 20 - 50 employees)
- We are now looking to China & Brazil as sources to help us remain competitive. Once a source is found we will no longer be able to justify operation of the [Maine] mill. (Engineered wood facility, 20 - 50 employees)
- Invest in technology to reduce costs as much as possible. (Wood product manufacturer, 20 - 50 employees)
- Keep regulations low. What good are forest cut permits and reports? Take a plane ride every month and save us the trouble. (Softwood sawmill, 20 -50 employees)
- It may be too late to do anything. (Hardwood sawmill, <20 employees)
- Practice good forest management so that more restrictive laws are not passed. (Softwood sawmill, >100 employees)
- Reduce electrical costs
    - Reduce taxes
    - Harvest the growth on public lands
    - (Engineered wood facility, >100 employees)
- Promote new industry and technology in forestry. (Softwood sawmill, <20 employees)
- Embrace technology, elect a favorable legislature, conservation easements that guarantee working forest, tax reform. (Hardwood sawmill, >100 employees)
- Work together as an industry. (Wood product manufacturer, 20 - 50 employees)
- Stay up to date technically, remain competitive. (Softwood sawmill, >100 employees)

- Provide a stable platform on policies to enable a sustainable, affordable supply of fiber for the industrial base to be able to compete on a world market. (Pulp & paper facility, >100 employees)
- Concentrate on providing a supply of skilled workers. (Softwood sawmill, >100 employees)
- Stop clearcutting. (Wood product manufacturer, 20 - 50 employees)
- Exports to Canada (timber products) – it really affects pricing of all forest products in Maine.
- Stop taxing us to death. The state does not want any industry. This is supposed to be a tourist state, I guess, because they don't want any logging done.
- We have to be careful of over-harvesting (especially white pine). Southern Maine has to manage its resource base by concentrating housing development and leaving larger stands in timber production. (Softwood sawmill, <20 employees)
- Make imports more limited – possibly a duty. (Softwood sawmill, <20 employees)
- Grow trees faster, lower energy costs, find niche markets (FSC, for example), need stability at all levels – rules keep changing. (Pulp and paper facility, >100 employees)

Question 26 -- What would make you more likely to make capital investments in your Maine facility?

- Eliminate the personal property tax on business equipment (wood product manufacturer, <20 employees)
- Stable tax policy, business oriented administration and legislature, reduced regulatory burden. (Pulp & paper facility, >100 employees)
- Less government and insurance. (Wood product manufacturer, 20 - 50 employees)
- Help with workers comp, logs going to Canada. (Hardwood sawmill, 50 - 100 employees)
- Markets staying good. (Softwood sawmill, <20 employees)
- Process equipment that reduces the physical demands of the job and the need for labor. (Softwood sawmill, 50 - 100 employees)
- We have done well here and will continue to invest here. (Softwood sawmill, 20 - 50 employees)
- Lower worker's compensation, lower electricity. (Hardwood sawmill and wood product manufacturer, >100 employees)
- Higher rate of return on product, greater confidence that a continued supply of quality raw materials are available. (Softwood sawmill, 50 - 100 employees)
- By being certain the wood supply will be there in the future at a reasonable price. (Engineered wood facility, >100 employees)
- New tax structure. (Softwood sawmill, 20 - 50 employees)
- People buying wood products instead of plastic or metal. (Hardwood sawmill, <20 employees

- Assurances that the raw material (wood) needs can be met in the future. (Engineered wood facility, >100 employees)
- A stable and predictable forest policy and regulatory process -- after all poor regulations and high taxes are removed.
- Less risk with regulatory climate , resource availability and market growth potential. (Softwood sawmill, >100 employees)
- Making a profit. (Wood product manufacturer, 20 - 50 employees)
- Ability to anticipate a return on investment. (Hardwood sawmill, 20 -50 employees)
- Streamlined permitting process
- We presently invest an average of $1 million annually. (Softwood sawmill, 51-100 employees)
- Stable, cost-effective wood supply (engineered wood facility, >100 employees)
- Confidence in the future. (Hardwood sawmill, 20 - 50 employees)
- Market growth and stability. (Engineered wood facility, 20 - 50 employees)
- Already doing it. We need a level playing field when it comes to competing with countries such as China where their economy is manipulated by currency controls. (Wood product manufacturer, 20 - 50 employees)
- Lower the cost of doing business in Maine and lower electrical costs. (Wood product manufacturer, <20 employees)
- Stability in costs – health care, etc. The BETR program continues to be under attack. (Softwood sawmill, >100 employees)
- Tax benefits and Renewable Energy Credit system similar to that of Massachusetts. (Softwood sawmill, <20 employees)
- Enhance BETR program, reduce regulation, end senseless public referendums, increased markets. (Hardwood sawmill, >100 employees)
- Stop all foreign trade in wood products.
- More profitably. (Wood product manufacturer, 20 - 50 employees)
- The thought that we might someday have a more conservative group in Augusta. (Softwood sawmill, >100 employees)
- Best business climate in the country! (Pulp & paper facility, >100 employees)
- Better business environment in the state. (Softwood sawmill, >100 employees)
- Tax incentives (wood product manufacturer, 20 - 50 employees)
- We make investments every year. The size of the investment is dictated by the strength of the timber market. (Softwood sawmill, <20 employees)
- If it were profitable and if it adds to shareholder value. (Pulp and paper facility, >100 employees)

Question 27 -- What would it take to have you make significant investments in energy conservation?

- Something that makes a diesel engine more efficient (wood product manufacturer, <20 employees)

- Not an issue – we have a huge biomass boiler that has helped dampen the effect of high energy costs. We are a net seller of electricity. (Pulp & paper facility, >100 employees)
- Already making investments in energy conservation due to high energy costs in Maine. (Pulp & paper facility, >100 employees)
- Paybacks 2.5 years or less (softwood sawmill, <20 employees)
- Effective incentives to reduce payback period. (Softwood sawmill, 50 - 100 employees)
- Demonstrated payback period of 5 years or less. (Softwood sawmill, 20 - 50 employees)
- We have already done much to conserve energy with efficient motors and lighting. (Softwood sawmill, 50 - 100 employees)
- A good return on investment. (Engineered wood facility, >100 employees)
- Less costly energy. (Softwood sawmill, 20 - 50 employees)
- They would have to be cost effective and not because the cost of energy in Maine is higher than other areas. The high cost of energy in Maine is a reason to look elsewhere to expand right now. (Engineered wood facility, >100 employees)
- Have already determined that energy conservation is second most important thing to address (after markets) (softwood sawmill, 20 - 50 employees)
- Tax incentives and more stable energy market.
- Ability to anticipate a return on investment. (Hardwood sawmill, 20 -50 employees)
- Energy credits for business and residential renewable portfolio like other New England states.
- Viable return on investment (engineered wood facility, >100 employees)
- It would have to make economic sense for us to do so. (Hardwood sawmill, 20 - 50 employees)
- Short payback and financial incentives. (Engineered wood facility, 20 - 50 employees)
- A regulatory environment that would make it easy to be more responsive to needs of industry. (Wood product manufacturer, 20 - 50 employees)
- Tax benefits and Renewable Energy Credit system similar to that of Massachusetts. (Softwood sawmill, <20 employees)
- We are currently looking into a sawdust burner to heat all our facilities, but I am not sure that financially we can afford it. (Wood product manufacturer, 20 - 50 employees)
- Tax incentives, an easier DEP to deal with, and a positive cost/benefit relationship. (Softwood sawmill, >100 employees)
- Already doing everything that technology can provide. (Pulp & paper facility, >100 employees)
- Money for initial changeover. (Softwood sawmill, <20 employees)
- As long as you have a decent payback you can fund investment. (Softwood sawmill, <20 employees)

- It is in progress as a matter of survival. It is our second highest cost (behind fiber). (Pulp and paper facility, >100 employees)

Question 28 -- What would help you find, train and keep qualified workers for your facility?

- Schools that would still encourage kids to go into the trades – they spend all their time telling kids to go into "high tech jobs" (wood product manufacturer, <20 employees)
- Vocational colleges need to embrace forestry issues. Loggers are scarce and their age is high (pulp & paper facility, >100 employees)
- Less welfare. (Wood product manufacturer, 20 - 50 employees)
- Being able to pay more and give more benefits. (Hardwood sawmill, 50 - 100 employees)
- Expansion of the governor's training initiatives to include skilled labor (engineered wood facility, >100 employees)
- Teach the 3 R's in school. (Softwood sawmill, <20 employees)
- First the state must make it attractive for business to locate or expand. This would make it attractive to the youth and stem the migration of same. Furthermore there is a significant substance abuse issue that must be dealt with. (Softwood sawmill, 50 - 100 employees)
- Revamping of the welfare / unemployment system so that qualified laborers would have to work to earn basic necessities. (Softwood sawmill, 20 - 50 employees)
- The ability to pay a higher wage. (Softwood sawmill, <20 employees)
- Manufacturing jobs are difficult to staff, as the work is often not appealing to the younger generation. Skilled workers are often lured away to better opportunities than the forest industry. (Softwood sawmill, 50 - 100 employees)
- Most qualified people are leaving this part of it for higher paying jobs. We pay well for the area; however they can go elsewhere for more money. (Engineered wood facility, >100 employees)
- Cut welfare programs for people able to work. (Hardwood sawmill, <20 employees)
- Medical insurance. (Softwood sawmill, 20 - 50 employees)
- Uncertain. If industry was more profitable, we could afford to pay more. Blueberry and fishing industries take away qualified workers. (Softwood sawmill, >100 employees)
- Ability to pay more. (Wood product manufacturer, 20 - 50 employees)
- The state to stop providing social welfare. Our newspaper advertising for workers very rarely produces any applicants. (Softwood sawmill, 51-100 employees)
- Money. Our biggest problem has always been our ability to pay high enough wages to keep qualified personnel. (Hardwood sawmill, 20 - 50 employees)
- Steady, long-term market commitments, competitive raw material costs (logs). (Engineered wood facility, 20 - 50 employees)

- Need to have motivated employees that have good work habits. We can train but they need to want to work. (Wood product manufacturer, 20 - 50 employees)
- Need to have a program to train millwrights (currently none are available). (Softwood sawmill, >100 employees)
- Larger labor pool, an educational system tailored to this industry. (Hardwood sawmill, >100 employees)
- Better pay and better benefits (wood product manufacturer, 20 – 50 employees)
- It's not finding workers, it's keeping them. A lot of the younger generation finds it is hard work, and most don't want to work hard. (Softwood sawmill, <20 employees)
- Do away with the welfare state. Get tough on illegal drugs. Improve the work ethic. (Softwood sawmill, >100 employees)
- Positive business climate that provides hope for the next generation to stay and work. (Pulp & paper facility, >100 employees)
- More career fairs, better system to provide access to skilled workers, incentives for these skilled workers to stay in Maine. (Softwood sawmill, >100 employees)
- We are losing Maine jobs at a fast pace. A lot of people are moving away. Need more industry. (Wood product manufacturer, 20 - 50 employees)
- Does not apply. Our facility hires only people with college degrees in paper manufacturing of some form. Technical or engineering. (Pulp & paper facility, >100 employees)
- Affordable health insurance and a higher wage rate. (Softwood sawmill, <20 employees)
- Don't have a problem here. Many parts of this business, there isn't training for. Perhaps community colleges could do better training craftsmen for the pulp & paper industry. Most of our employees learn from on-the-job training. (Pulp and paper facility, >100 employees)

Question 29 - If you had a problem with Maine state government, who would you call?

- My state representative / senator – *16 responses*
- I don't know who to call – *6 responses*
- The governor – *5 responses*
- Commissioner / Bureau Director – *5 responses*
- Maine Forest Products Council – *2 responses*
- There is no one – *1 response*
- We try all the time, and it is hard to get anything done that's of great importance – *1 response*
- Peter Lammert – *1 response*
- Our peers and associations then collectively go see the problem folks – *1 response*
- Attorney or professional in the field – then the department involved – *1 response*
- Person responsible for whatever department it falls under – *1 response*

- The first thing that comes to mind is to call our congressman, but frankly that seems [unproductive]. We also belong to some industry groups who have the ability to lobby, and we voice our opinion there. – *1 response*
- The appropriate department specific to the problem – *1 response*
- I would look at the web site first – *1 response*
- Whoever is the most supportive and backs our industry – *1 response*

Question 30 -- Is there anything else you would like to tell us?

- Maine *must* control spending on health care infrastructure. We have too many facilities and underutilized equipment (wood product manufacturer, <20 employees)
- Maine needs to (pulp & paper facility, >100 employees)
    - Lower taxes
    - Lower workers compensation
    - Lower health care
    - Stop passing laws against industry
- Thank you for your interest and time in our industry. (Softwood sawmill, 20 - 50 employees)
- Very good survey. (Hardwood sawmill and wood product manufacturer, >100 employees)
- Tree growth tax law needs to be stabilized so landowner will have confidence in it. (Softwood sawmill, 50 - 100 employees)
- We are concerned about our future due to the rising cost of wood. Something has to happen to bring the cost down or we will not be here for the next 20 years. Everything is working against us. We have the highest freight rates and energy costs in the country. (Engineered wood facility, >100 employees)
- Good luck. (Hardwood sawmill, <20 employees)
- The cost of health care is higher here in Maine than at any of our facilities in the U.S. (Engineered wood facility, >100 employees)
    - Financial incentives are out there for job creation, but nothing for job retention until a company is about to close its' doors. Then government leaders come to the rescue. In many case competitiveness is gone – it is too late.
    - Our employees are taxed too much. Income tax, sales tax, property tax, license and fees for anything and everything they do. Does anyone in government think that this might contribute to the so-called brain-drain of our youth in Maine?
- Until we know what is ours in this state and taxes and regulations become reasonable there is little future.
- Major capital expenditures had been planned for [our Northern Maine] facility for 2004 – 2007. Due to recent problems (wood costs rising, governor's support of collective bargaining, liquidation harvesting regulations, etc.) our corporation has suspended planned capital investment.
- Stop burdening us down with regulation. (Softwood sawmill, >100 employees)

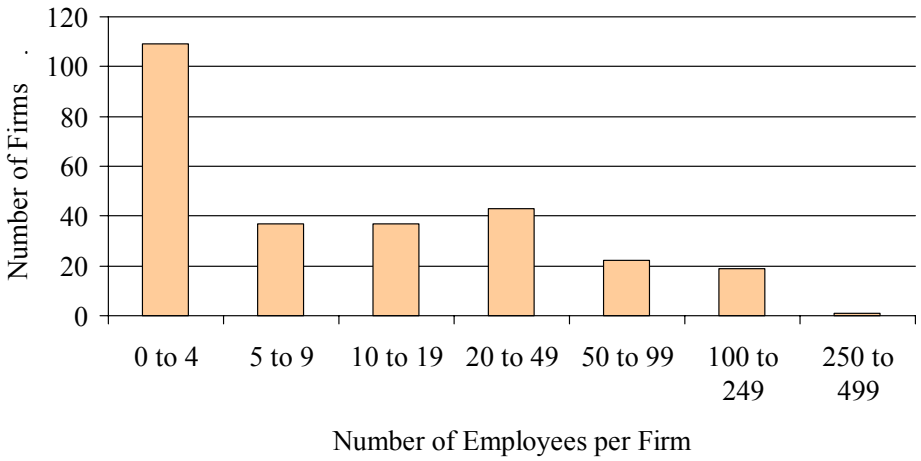
- Maine isn't at all interested in company our size. (Hardwood sawmill, <20 employees)
- For all the unemployment that is advertised, we don't see it in [northern Maine town]. We have closed one shift because of lack of labor and are continually looking for trainable laborers with a good work ethic. (Softwood sawmill, 51-100 employees)
- In regard to competitive pressures, my biggest concern about foreign competition is the manufacturing base leaving the U.S. Our business caters to manufacturers, and over the last ten years we have had several large customers close their doors due to foreign competition. We make pallets, so there is little concern about them being shipped here, but if continue to lose customers our future is suspect. (Hardwood sawmill, 20 - 50 employees)
- After 24 years I have returned to my roots in [Northern Maine]. The whole area is very depressed economically with not much future ahead. I feel strongly that something viable such as laminated flooring can be a big boost to the Northern Maine area. The market is strong, the future bright and hardwood species native to Northern Maine would allow a good selection for the production line. Especially hard maple. (Engineered wood facility, 20 - 50 employees)
- I appreciate the purpose of this survey, but we are up against the WORLD. The little, environmentally concerned Maine won't impact anything by itself. Just like Iraq. People were happy when they were safe, but they didn't know all the background tactics that made it safe for them. (Softwood sawmill, 20 -50 employees)
- Maine is an extremely expensive state to do business in. There is a shortage of skilled workers, especially millwrights. There does not appear to be a firm, focused direction by the state government to improve the forest products industry in the state. (Softwood sawmill, >100 employees)
- There will not be any mills if logs are not allowed to freely flow to appropriate markets. (Hardwood sawmill, >100 employees)
- Our future is predicated on our ability to attract capital, which is highly leveraged by the opportunity for capital to generate return. The greater the risk the greater the cost of capital. Maine's business climate is not seen as very friendly in the investment community. (Pulp & paper facility, >100 employees)
- Stop clearcutting and trucking wood to Canada. (Wood product manufacturer, 20 - 50 employees)
- Let's get state & federal spending checked. We should have our leaders run the government more like a business and stick to a budget. We should be ashamed of being one of the highest states to be taxed and one of the lowest in income. (Softwood sawmill, <20 employees)
- Stop sending surveys! (Softwood sawmill, <20 employees)

MICRO-BUSINESSES IN THE FOREST PRODUCTS MANUFACTURING SECTOR

Micro-businesses in the Forest Products Manufacturing Sector

While many of Maine's secondary wood manufacturers are larger, a good percentage of firms in this sector are what some classify as "micro-businesses" that employ a small number of individuals. In 2002, over half (53%) of the business entities in Maine's sawmill and wood products sector had fewer than ten employees

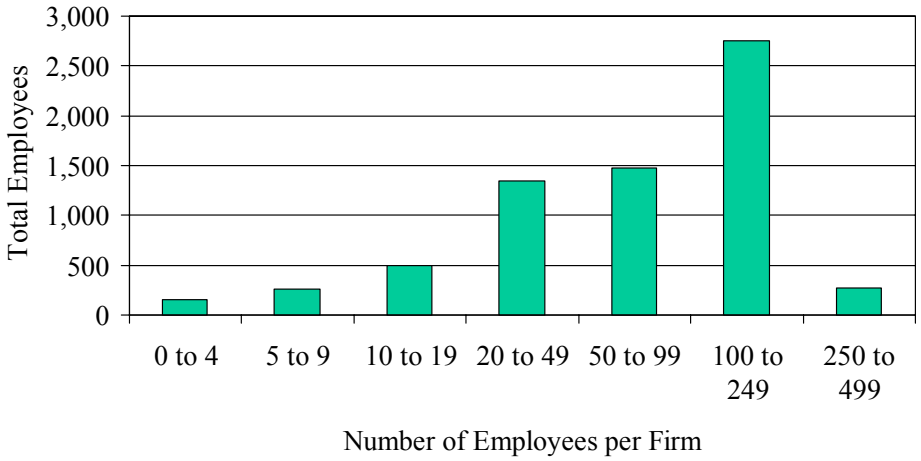
Figure 114. Number of firms by firm size, sawmills and wood products, 2002



Data source: Maine Department of Labor

While this represents a large number of firms, this does not necessarily represent a large number of employees. In 2002, six percent of the employees in the sawmill and wood products sector worked at firms with fewer than ten employees.

Figure 115. Number of employees by firm size, sawmills and wood products, 2002



Data source: Maine Department of Labor

Micro-businesses are often the creation of a rural entrepreneur, and produce an amazingly large variety of products, from lumber to musical instruments and lawn ornaments. Businesses in this size category face challenges that other forest industries face – e.g., the cost of electricity, access to affordable health care, and the cost of raw materials – but also face challenges due to their small size.

Micro-businesses are often one individual who must handle all aspects of the business – manufacturing, financing, advertising and marketing, bookkeeping, and other duties that are often handled by administrative and support staff in larger businesses. Often, though certainly not always, "micro-businesses" are a second job, part-time, or post-career.[157]

Additionally, many micro-businesses are new businesses that have issues often associated with any start-up. These include cash flow, development of customers, and dealing with the legal and regulatory requirements of establishing an enterprise. In spite of their size and challenges, many of these micro-businesses are very successful and provide their owners with a lifestyle with which they are satisfied. In general, micro-businesses represent a microcosm of the forest products industry, with many of the same challenges and needs. As with larger businesses, these businesses also often lack an understanding of existing programs and trade groups in the state, a perennial problem.

[157] Personal communication, Professor Mark Lapping, University of Southern Maine, August 1, 2004.

Case Study - Maine WoodNet

Maine WoodNet was founded in the mid-1990s as a way to urge quality manufacturing of wood products coming from sustainably managed forestland in the region. Its membership is comprised of approximately 50 small firms (many 1-person shops) that seek to fulfill the Mission of the organization:

"*...to facilitate cooperative manufacturing, innovating marketing, and wood-use efficiency by forest based businesses, while promoting networking and educational opportunities focused on improved forest stewardship."*

The Wilderness Society, a national non-profit organization founded in 1935 and with a mission to:

"Deliver to future generations an unspoiled legacy of wild places, with all the precious values they hold: Biological diversity; clean air and water; towering forests, rushing rivers, and sage-sweet, silent deserts."

… founded Maine WoodNet after completing several forest-based economic studies in the Northern Forest region. As Spencer Philips, The Wilderness Society's resident economist in the Northern Forest region said, "It's not how many logs that come out of the forest … its how many dollars come out of the logs."

Maine WoodNet is a marketing and manufacturing network comprised of wood products businesses located in the western lakes and mountains region of Maine. It attempts to put into practice its ideas for improving the health and sustainability of forest-based businesses. By helping its members work together to make and market wood products, to build business and woodworking capacity, and to better connect fine craftsmanship with good forestry, Maine WoodNet strives to help small businesses in this region compete in an increasingly global market for furniture and other solid wood products.

Greater "wood-use efficiency" is a key goal of Maine WoodNet – leaving more space on the land and in the economy for wildland conservation.

Maine WoodNet focuses on the following in its quest to meet this goal:

- Facilitating member-to-member collaboration – enabling members to improve products design, better utilize surplus and scrap wood, and produce joint products;
- Providing marketing assistance – helping members position their products to the greatest advantage in the marketplace;

- Providing or facilitating technical assistance – connecting members with training and information they can use to improve their products and business management;
- Organizing members' participation in tradeshows and events – helping members increase access to wholesale and retail buyers and the public;
- Creating opportunities using forest products certification – developing and implementing a "group chain of custody" certification under the Forest Stewardship Council system;
- Creating opportunities for retail merchandising – launching SugarWood Gallery, Inc. as a venue for showcasing and selling members' products and educating the public about forest/community interactions.

Is any of this working? One WoodNet member's testament suggests it is:

"Since we joined the organization, Maine WoodNet has significantly expanded the business opportunities for W.A. Mitchell Fine Furniture [Temple, Maine]. Our association with fellow members has provided us with resources to value-add our product line. Many doors of opportunity have been opened including Forest Stewardship Council Group Chain of Custody Certification. These tools will help us to achieve our growth and market placement objectives." *Dan and Janice Maxham*

Survey of Maine Forest Industries – Micro-business Sector

Description of Survey

In order to solicit information and input from a broad range of Maine forest industries, INRS conducted surveys of both larger and small (micro) forest product manufacturers. For the survey of micro-businesses, a copy of the survey (including a signed cover letter and self-addressed stamped envelope) was sent to 49 forest products companies with 10 or fewer employees in August 2004. The list included sawmills, wood product companies, loggers, and carpenters, and was provided by Maine WoodNet (with additions of some known forest product micro-businesses by INRS) for purposes of this survey. As some of the questions were tailored directly to micro-businesses, the results are presented separately. INRS recognizes that the list used is not a complete inventory of all forest product micro-businesses in the state of Maine, but believes that the list represents a fair sample of the range of Maine forest-based micro-businesses.

The survey was anonymous, allowing companies to share information without concern competitors or others would use information provided by a company. A copy of the survey is included in the Appendix D of this report.

Survey Respondents

A total of 13 responses were received, for a response rate of 26.6%. This response rate is considered acceptable for a survey of this nature. Survey respondents included artisans, a logger, and a variety of wood products manufacturers. INRS recognizes that this is a small sample; this segment of the industry is difficult to reach.

Survey Results

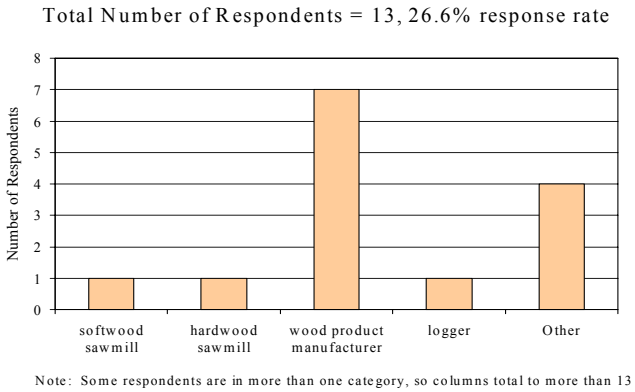
The following information describes the responses received from this survey. It should be noted that not all respondents answered every question, and information is provided only for questions that were answered by eight or more of the respondents.

Demographic

The 13 small businesses that responded employ a total of approximately 37 employees, including full-time, part-time, and seasonal employees. Of those, 26 are full-time employees. The mean (average) number of full-time employees per respondent is 2; the median is 1.

Survey responses were received from a wide variety of the micro-enterprise component of Maine's forest industry, with the greatest number of responses (7) coming from wood products manufacturers producing a range of products, from balsam fir pillows to furniture.

Figure 116. Survey Responses by Forest Industry Sector



As seen in Figure 2, when viewed by employees, the largest response came from wood products manufacturers, who represent a diversity of products from balsam pillows to furniture.

Figure 117. Total Employees for Survey Respondents by Sector

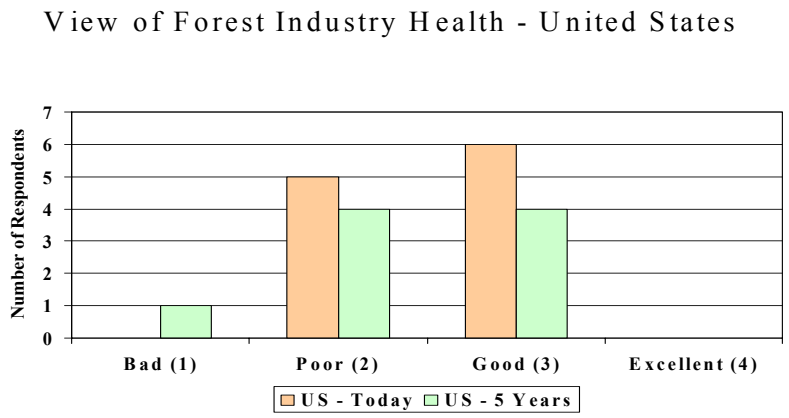
	Employees Total
Softwood Sawmill	1*
Hardwood Sawmill	1*
Wood Products Manufacturer	15
Logger	4
Other	16
All Respondents	37

*These represent the same firm.

Perception of industry health

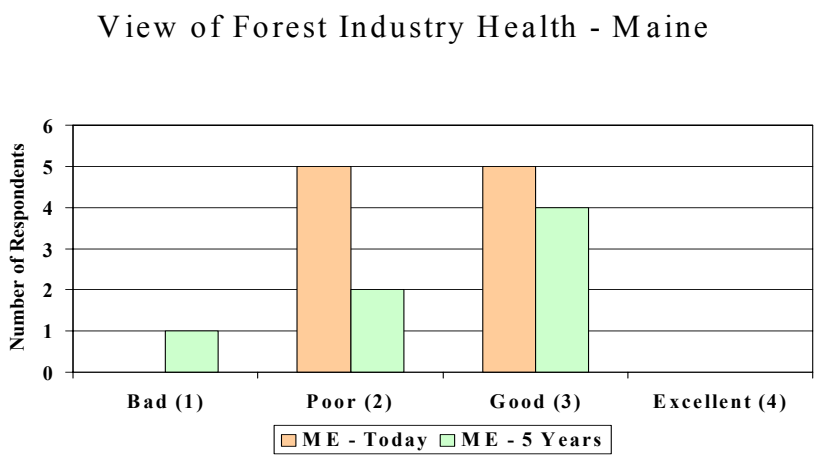
As a key component of the survey, respondents were asked about their perception of forest industry health, both today and in five years. This question was asked for the forest industry in the entire United States and in Maine specifically. The average respondent indicated that they view industry health nationwide as relatively poor (2.5), and that they are not optimistic about industry health five years from now (2.3).

Figure 118. View of Forest Industry Health in the United States



Similar to the current view of the U.S. forest industry, the average respondent indicated that they view the current health of Maine's forest industry as between poor and good (2.5), and on average do not see this changing in five years (2.4).

Figure 119. View of Forest Industry Health - Maine



Responses were similar when respondents were asked about the health of their sector.

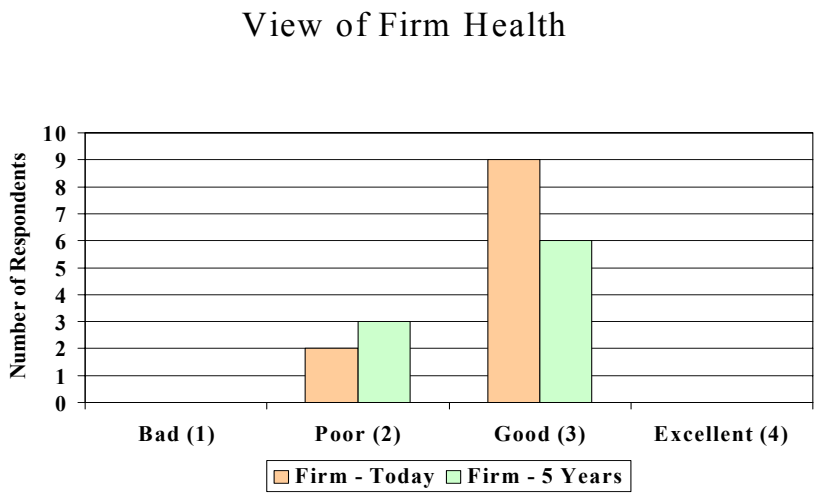
Figure 120. Respondent View of Forest Industry Health

		Number of Responses				
		Bad (1)	Poor (2)	Good (3)	Excellent (4)	Average
Today	Industry - US	0	5	6	0	2.5
	Industry - ME	0	5	5	0	2.5
	Sector - US	0	4	6	0	2.6
	Sector - ME	0	5	5	0	2.5
	Firm	0	2	9	0	2.8
5 Years	Industry - US	1	4	4	0	2.3
	Industry - ME	1	2	4	0	2.4
	Sector - US	1	2	5	0	2.5
	Sector - ME	1	4	3	0	2.3
	Firm	0	3	6	0	2.7

Most respondents viewed their firm's current health as better than the national or state average (2.8), but were slightly less optimistic on average about the future health of their firm (2.7). As with the results from the survey of larger firms, there are a number of possible explanations for this, including:

- The firms that responded to the survey may, on average, be in better financial health than the industry as a whole, either nationally or in Maine;
- It is possible that respondents self-selected, and those in good financial health were more likely to complete and return the survey; or
- Those that completed the survey are quite familiar with the finances and plans of their individual firm, but are not as aware of the finances and plans of others in the industry.

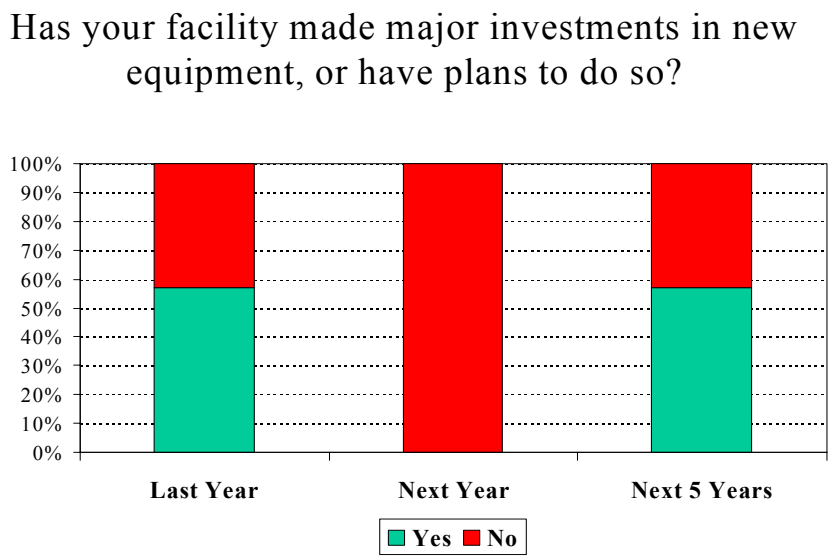
Figure 121. View of Firm Health



Investments and Investment plans

In order to survive and prosper in the increasingly competitive global marketplace, Maine firms have been investing, and continue to invest in their operations. Survey respondents were asked if they had made, and intended to make "major investments in new equipment" (the level of "major investment" was not defined). In an encouraging sign, over half of the respondents have made investments in the past year and plan to make additional investments in the next five years. However, no firms had concrete plans to make additional investments in the coming year.

Figure 122. Major Investments in New Equipment



Forest Certification

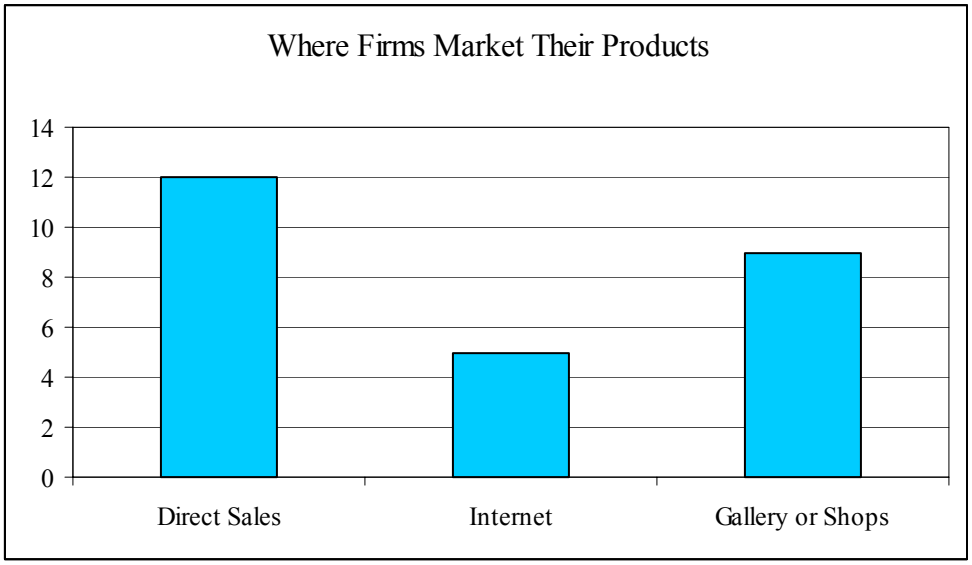
Firms were asked if their operations are certified by third-party auditors such as the Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), or other certification entities. Of the 13 respondents, three had FSC-certified operations and one was certified by another entity. Together this accounts for 31% of respondents.

Rediscovered Wood

Firms were asked if they use rediscovered wood in their products. Nearly half (6) of respondents, or 46%, use rediscovered wood in their products.

Marketing
Firms were asked where they marketed their products. Most firms (13) use direct marketing to sell their products. Second to direct marketing is marketing through galleries and shops (9). Internet sales are used by only five businesses. This indicates a likely technology gap for these firms, who potentially could increase their marketing at relatively low cost through Internet channels.

Figure 123. Where Firms Market Their Products



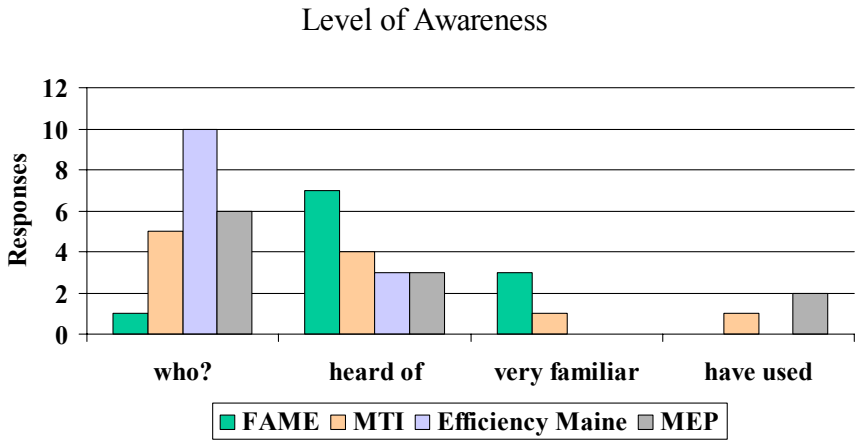
Programs available to the forest industry

Maine has a number of business assistance programs available to forest industries (as well as other industries). In an effort to gauge how well forest product micro-businesses know these programs, and to determine whether forest industry perceives these programs as meeting their needs, respondents were asked about their awareness of four programs, and whether they perceived these programs fit their needs:

- FAME – The Finance Authority of Maine
- MTI – The Maine Technology Institute
- Efficiency Maine
- MEP – The Manufacturing Extension Partnership

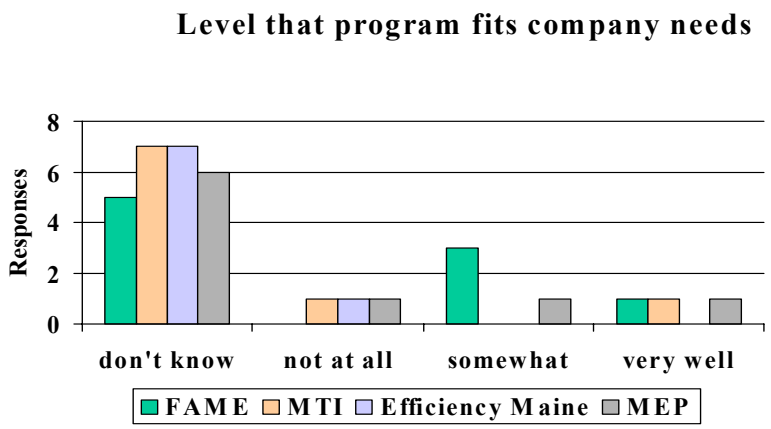
These are the same industry assistance programs that larger forest product manufacturers were surveyed about; the responses from micro-businesses are similar.

Figure 124. Micro-business Awareness of Business Assistance Programs & Organizations



In addition to knowing little about these four programs, industries also don't know if the programs and services offered fit their needs. While it may be true that some organizations or programs do not offer products that meet the needs of the forest-based micro-businesses, it is surprising to find that the majority of respondents did not know whether these programs fit their needs. This clearly points to a need to connect forest micro-businesses to programs that exist. In addition to the four programs surveyed, Maine offers a number of other programs to industries; there is no reason to believe that other programs have greater awareness levels.

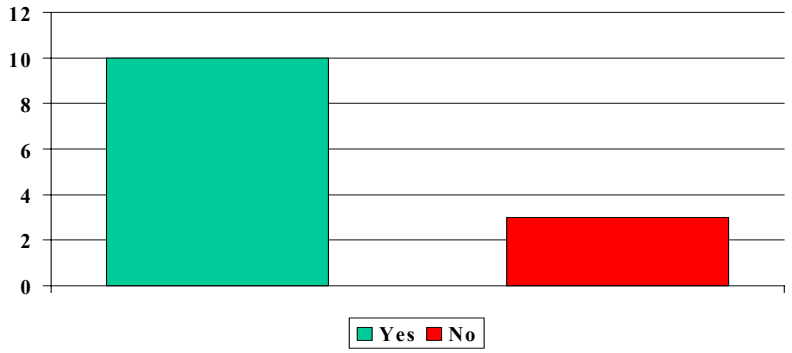
Figure 125. Micro-business Belief that Organizations/Programs Meet Their Needs.



Doing business in Maine

Respondents were asked whether they would consider siting a new forest product micro-business in Maine, assuming necessary resource availability. Seventy-seven percent indicated that they would; the remainder, excluding one non-respondent, indicated that they would not. This is a dramatic difference when compared to the survey of larger forest industries.

Figure 126. Number of Respondents Who Would Consider A New Facility in Maine.

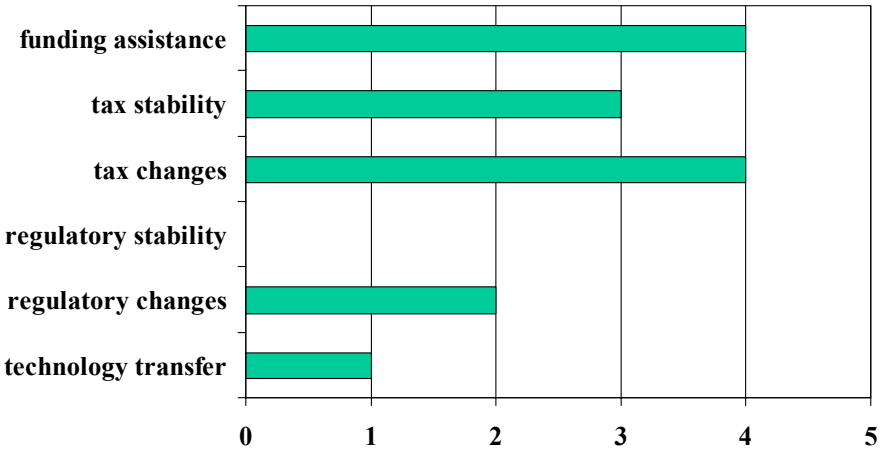


Technology Issues

The investment in and implementation of new technology has been, and will continue to be, an important part of the success of Maine's forest industry. Given the role that increased productivity and new product development may play in the future, respondents were asked several questions regarding their perspective on adopting new technology.

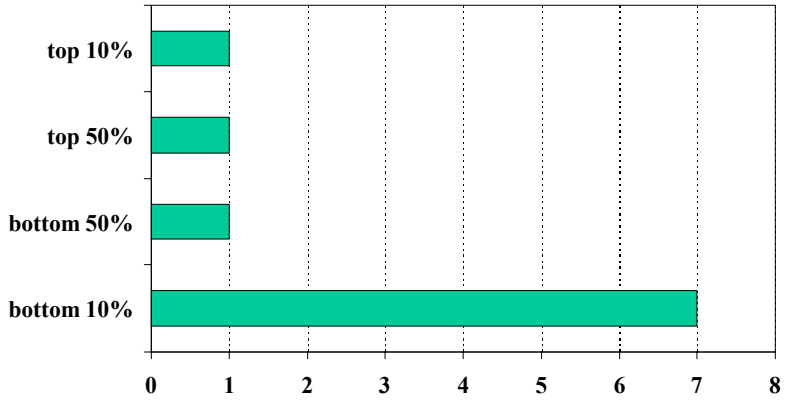
Recognizing that many Maine forest industries -- across all sectors -- will need to make continued investments in technology, respondents were asked what Maine could do to encourage investment. These data do not offer a clear pattern. Many respondents indicated that that tax changes and funding assistance would encourage technology investment, with tax stability also frequently cited.

Figure 127. Respondent View of How Maine Could Encourage Technology Investment



Respondents were asked where they view their facility in technology investments over the last five to ten years, when compared to global competitors. The response is dramatic, with most respondents saying they were in the bottom ten percent (70%) of technology investment globally.

Figure 128. Respondent Perception of Firm's Technology Investment in Last 5 – 10 Years



Open-Ended Questions

Firms were asked a series of open-ended questions. A complete listing of survey responses follows. *It should be noted that the opinions expressed are those of the survey respondents, and do not necessarily reflect the opinions of INRS or findings elsewhere in this report.* INRS has attempted to group and summarize responses, but readers are encouraged to read all responses in order to best understand the range of comments and suggestions received.

Respondents were asked what they thought the most important thing Maine could do to help the long-term competitive position of the forest industry. Although no clear trend arose, a number of respondents focused on business climate issues and foreign competition and others highlighted resource sustainability issues.

When asked what the industry could do to help its own long-term competitive position, the largest number indicated that foreign competition, with Canada in particular, posed the greatest threat to competitiveness. One respondent highlighted the workers' compensation system as needing reform.

When asked what would encourage increased investment in their facilities there was no clear pattern among the responses. The issue of Canadian and global competition was highlighted again. Some responses highlighted rising energy, fuel, and insurance costs as being an obstacle.

When asked what would help employers find, train and keep workers, there was no clear pattern among the responses, which ranged from better tax polices for small businesses to improving the image of the industry, and the need for lower workers' compensation rates and for import duties.

Respondents were asked who they would contact if they had a problem with Maine state government. Except for three respondents who didn't know, the five other respondents had very specific answers, highlighting their knowledge of where to find answers to their questions.

When asked what the state could do to help firms market their products, there was again no distinct trend among responses. Some respondents recommended that the state provide grants for marketing expenses. One respondent recommended an overall improvement in the state's business climate.

Responses to Open-Ended Questions

The following are the questions asked and responses received to the open-ended questions asked in the survey, along with a description of the respondent.

Question 27 -- What is the most important thing Maine state government could do to help forest industries long-term competitive position? Why (please be as specific as possible).

- There is more money per unit of forestland in good wood into good products than there is in poor wood into cheap products. This takes time and effort per unit of forest and a consistent long-term effort toward good, private wood lands is essential to this state. (Sawmill, 1 employee)
- Do like Canada and ban export of logs and give grants for equipment to create jobs (Wood product manufacturer, 6 employees)
- Promotion of "Made in Maine" (wood product manufacturer)
- Reduce taxes (Wood product manufacturer, 1 employee)
- Try to keep and use as much of our resources in Maine instead of sending ours out of state and import other states' and countries' products (1 employee)
- Healthy forest with sustainable growth, harvesting mature tree, especially hardwoods (Wood product manufacturer, < 5 employees)
- Better marketing assistance. I do not benefit at all by any Maine DECD program. And I have tried, believe me! (Wood product manufacturer, 8 employees)
  - Help/leverage with MEMIC. It's my worst nightmare
  - Lower payroll tax rate
  - Funding assistance for capital investment. We need to upgrade but the last three years have been devastating financially.
  - More $$$ for grants/assistance for innovations and product development that help us overcome the problems with foreign competition.
- Create some incentives for young people to enter this industry. Without a willing and able workforce I don't see how we will survive another 25 years. (Wood product, 2 full-time and 5 part-time employees)
- Be more business friendly, lower tax burden, find a way to keep manufacturing jobs in US. NAFTA is not free trade, it is costing many US manufacturing jobs that will never return. (Logger, 3 full-time and 1 part-time employees)
- Cut out the red tape (LURC). (Wood product artisan, no employees)

Question 28 -- What is the most important thing Maine forest industry could do to help its long-term competitive position? Why (please be as specific as possible).

- Develop a consistent policy to help the small private woodland owner. Develop a consistent policy to help the small private user of high-grade wood – small furniture-, cabinet-makers (Sawmill, 1 employee)
- Ban log export (Wood product manufacturer, 6 employees)
- Effective management (Wood product manufacturer, 1 employee)
- Worker's comp! We are literally being hung out to dry by a hostile, arrogant, Byzantine insurance system. It's our biggest frustration and financial drain. Why can't we create an industry self-help group-we all share the same problems (Wood product manufacturer, 8 employees)
- We must be able to compete fairly with Canada – right now it is not a level playing field. (Wood product manufacturer, 2 full-time and 5 part-time employees)
- Make world or global trade a level playing field. We cannot compete with third world countries that do not pay workers' comp, payroll taxes, livable wages, benefits, etc. (Logger, 3 full-time and 1 part-time employees)
- Cut out the red tape. (Wood product artisan, no employees)
- Easing of taxes related to forests and facilities (wood product manufacturer)

Question 29 -- What would make you more likely to make capital investments in your Maine facility?

- A stronger more viable base of high quality wood users in this state (Sawmill, 1 employee)
- Eliminate competition with foreign countries such as Canada and China (Wood product manufacturer, 6 employees)
- Lower taxes (Wood product manufacturer, 1 employee)
- Knowing that the economy would hold on long enough to let me pay back my investments (1 employee)
- Lower overhead costs! Better financing. (Wood product manufacturer, 8 employees)
- Elimination of personal property tax without returning to the inventory tax (wood product manufacturer, 1 employee)
- I am making capital investments with the idea of selling my operation in 10 years. (Wood product manufacturer, 2 full-time and 5 part-time employees)
- Profit margins. Fuel. Insurance prices keep going up. There is nowhere to pass this cost onto. Workers should be getting paid more but we are unable to do so. (Logger, 3 full-time and 1 part-time employees)

Question 30 -- What would it take to have you make significant investments in energy conservation?

- With the current cost of help for small industries, it's cheaper to buy energy (Sawmill, 1 employee)
- Quick payback ROI (Wood product manufacturer, 6 employees)
- Government subsidy programs (Wood product manufacturer, 1 employee)
- That's not a major factor for us. Not a front burner issue. I'd like to find ways to conserve energy but I can't figure out what else I can do. (Wood product manufacturer, 8 employees)

Question 31 -- What would help you find, train and keep qualified workers for your facility?

- Better education in the schools, better tax policies for small business (Sawmill, 1 employee)
- Market share -- limit imports, have tariff, tax or duty on imports
- Lower comp rates and knowing business would hold on (1 employee)
- Labor is too expensive in relation to prices I can get for product (Wood product manufacturer, 1 employee)
- Retention is not a problem. However, I am now in the process of learning about the worker training grants/program. Certainly the cost of training is a factor in holding us back from hiring. Career Center in South Paris seems to be a good resource. (Wood product manufacturer, 8 employees)
- Creating the positive image this industry deserves. We pay an excellent wage for our area – we have never had trouble finding employees. It's the lack of suppliers that has us worried. (Wood product manufacturer, 2 full-time and 5 part-time employees)

Question 32 -- If you had a problem with Maine state government, who would you call?

- Don't know (3 responses)
- Local state legislator (2 responses)
- Monica McCaughlin (1 responses)
- The applicable agency. The Bureau of Insurance and Workers Comp Dept. has been exceptionally helpful and responsive, but their mandate is so limited that they cannot serve all the needs of the insured. (1 response)
- My local legislator, the governor's office, or the commissioner's office of whatever branch I might be having trouble with. (1 response)
- Problem state agency for meeting of the minds – seek understanding first (wood product manufacturer)

Question 33 -- What could state do to help you market your products?

- Improve the overall climate for small business in this state (Sawmill, 1 employee)
- State should have a directory or website of businesses in Maine (1 employee)
- Direct money for marketing expenses, i.e. photography, printing, web development, trade shows. As stated in #27, the current program does not help us. How about including marketing expenses in MTI seed grants and other grants??? (Wood product manufacturer, 8 employees)
- Take the Maine Products Trade Show back from the private sector and make it affordable again. (Wood product, 2 full-time and 5 part-time employees)
- Promote "Made in Maine", and provide a group freight cost cushion for all "made in Maine" products. Shipping furniture can be costly. (wood product manufacturer)

Question 34 -- Is there anything else you would like to tell us?

- I use the term small business here as less than five employees (Sawmill, 1 employee)
- Stop handing out money to healthy young people that milk the system (work for welfare), crack down on fraudulent cases. Collect welfare work for cash money. People move to state to get on system. Also, honest people have a hard time to get off because they get cut off from benefits before they have a chance to get on company insurance, etc.
- Most all of these questions depend on the economy and other businesses to stay in business (1 employee)
- Sorry about the lack of responses. I'm just a one-man operation and am going to keep it that way. Too many headaches with hiring employees – both regulatory and reliability headaches. I am building my business by finding my niche and concentrating on making things that can't be mass produced (Wood product manufacturer, 1 employee)
- The last three years have been absolutely horrible, due to foreign competition. We have had to change everything we do in order to survive, which has been fruitful but expensive. So many businesses like ours have disappeared. Any help targeted to our needs would be greatly appreciated. MTI has been <u>great</u>. All of our insurers have been rapacious in their collection policies, rate increases, and self-serving policies. (Wood product manufacturer, 8 employees)
- Promote carved products. (Wood product artisan, no employees)
- Although I have always appreciated the supposed help of the state government, I don't believe much has actually helped. Most likely, just allow our businesses to do their work with the integrity we are known for. (Wood product manufacturer, 2 full-time and 5 part-time employees)
    - Perhaps-boost the tourism budget to get more people here.
- No, but thanks for the survey. (Wood product artisan, no employees)

MAINE'S BUSINESS CLIMATE

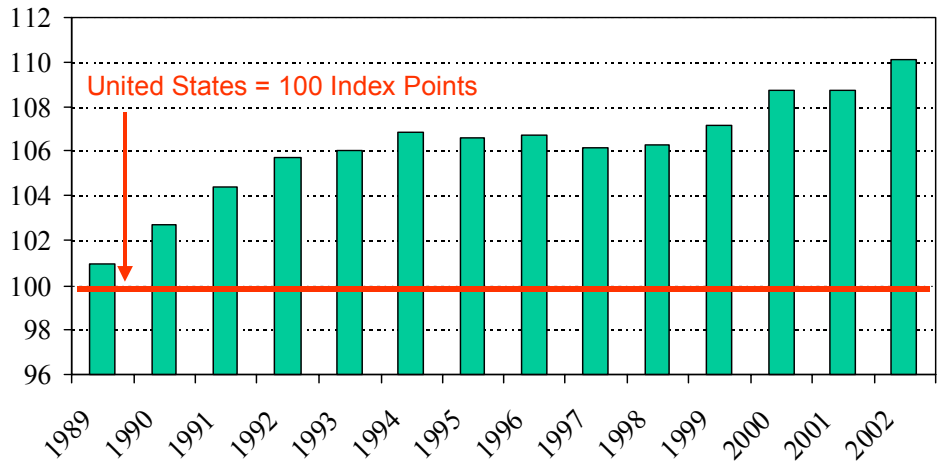
Maine's Business Climate

All sectors of Maine's forest industry compete in a challenging global, regional and often local competitive environment. As the forest industry becomes increasingly global, the "hosting conditions", or business climate, of a state become more important. Forest industries now have the ability to invest capital in all parts of the world, and are doing so. The business climate of a state impacts different types of business structures in different ways. For "captive" firms[158] – those that are a single facility located in Maine – it impacts a firm's ability to borrow money, invest in new equipment, and earn a profit. For existing firms with facilities in multiple jurisdictions[159], the business climate impacts decisions about which facilities receive capital investment and which do not. For business looking to move to Maine, the business climate impacts whether they make a decision to locate in Maine or not. The business climate in Maine – or any state – is certainly not the only factor that goes into making a decision on where to locate or invest in a forest products manufacturing facility, but it is often weighed heavily in a firm's decision-making.

[158] A typical example of a captive firm is a family-held lumber mill with one location.
[159] An example of such a firm is a paper mill held by a large company with mills in other states or countries.

According to data provided by the Maine State Planning Office, Maine's cost of doing business has been higher than the national average since at least 1989. For the purposes of this data, the "cost of doing business" is calculated using an average labor & benefits cost (65%), energy costs (15%), and tax burden (10%). Maine's cost of doing business in 2002, the latest year for which Maine data is available, is 110% (110 index points) of the national average. As noted by the Maine Development Foundation, "This represents a serious competitive disadvantage for Maine-based businesses … it is difficult to overstate the importance of this measure to the state's business climate."[160]

Figure 129. Cost of Doing Business in Maine, 1989 - 2002



Data Source: Maine State Planning Office

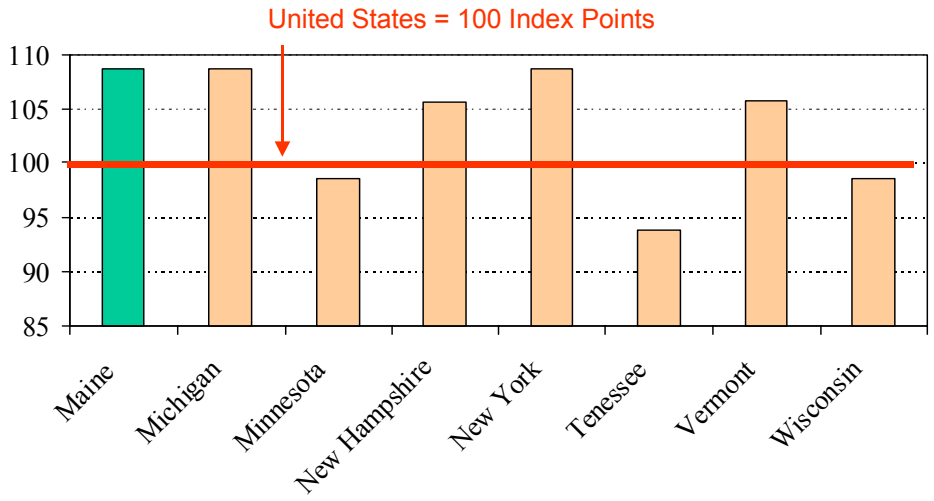
[160] Maine Development Foundation. *Measures of Growth 2004 Performance Measures and Benchmarks to Achieve a Vibrant and Sustainable Economy for Maine.* February 2004

The cost of doing business in Maine is trending upward when compared to the national average. At a 2003 forum, Maine State Economist Laurie LaChance indicated that it was a state goal to have the cost of doing business in Maine decrease to 103% of the national average (or 103 index points) by 2005[161]. Achieving (or approaching) this goal will require Maine to change current trends of rising "cost of doing business". *If* Maine were to continue on the course it has been on since 1989 relative to the rest of the country, with comparative costs steadily rising, one would expect that Maine's cost of doing business would rise to 121.5% of the national average (121.5 basis points) by 2025.

Year	2005	2010	2015	2020	2025
***Projected* Cost of Doing Business (using trend since 1989)**	111.0	113.5	116.1	118.6	121.2

It should be noted that not all factors that contribute to the cost of doing business are under the direct or complete control of Maine state government. Other states in Northern New England – New Hampshire and Vermont – also have a "cost of doing business" index above the national average, though lower than Maine's.

Figure 130. Cost of Doing Business, Maine and Selected States[162], 2000



Data Source: Maine State Planning Office

[161] LaChance, Laurie. "Maine's Paper Industry: In Perspective." Conference presentation at *The Current State of Maine's Pulp & Paper Industry*. April 4, 2003.
[162] The states of MI, MN, NH, NY VT and WI were selected to provide a look at other states with a similar forest type; TN was selected to represent a southern state.

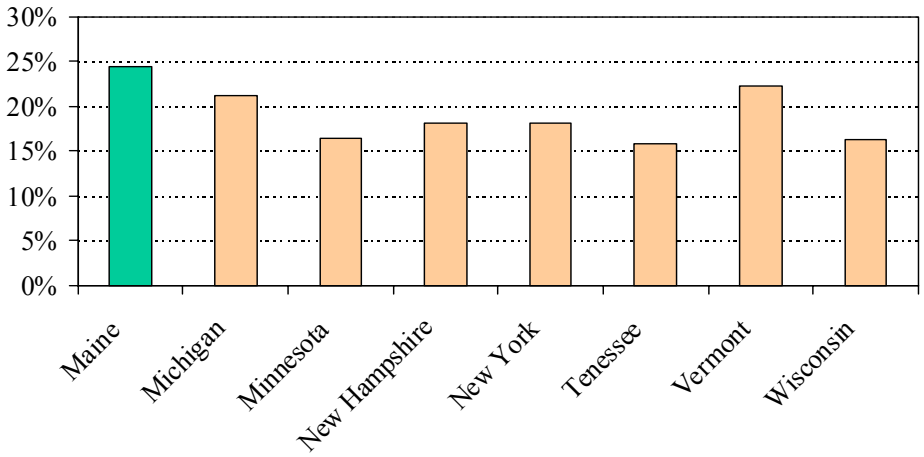
Taxes

When compared to other states and regions, Maine is a high-cost state for many forest industries. State and local taxes comprise a significant portion of this cost, and one that the State has direct control over. In a tax study of fiscal year 2003 state and local taxes on businesses, Maine was ranked as having the highest taxes in the nation as a percentage of capital income, fourth as a percentage of total private sector economic activity, and nineteenth in the business share of all taxes[163]. Other studies have also indicated that Maine has a relatively high business tax burden when compared to other states. Questions have been raised about the details of and appropriateness of methodologies used in this and other tax ranking studies[164]. However, the general finding of importance to this work – that Maine forest industries face a comparatively high tax burden when compared to other states and regions -- is not generally disputed. As noted by the Maine Development Foundation, "National indices and many experts place Maine in the top tenth percentile of states with the highest tax burden, which is cited by many Maine businesses as a disincentive to do business in the state."[165]

[163] Cline, Robert; William Fox, Tom Neubig and Andrew Phillips. *Total State and Local Business Taxes: A 50-State Study of the Taxes Paid by Business in FY2003*. Prepared for the Council on State Taxation. January 2004.
[164] Lawton, Charles and Frank O'Hara. *Ranking Maine's Business Climate*. Prepared for the Maine Center for Economic Policy. July 2004.
[165] Maine Development Foundation. *Measures of Growth 2004 Performance Measures and Benchmarks to Achieve a Vibrant and Sustainable Economy for Maine.* February 2004

According to information developed for the Council on State Taxation, the taxes on capital income are higher in Maine than elsewhere in the nation[166]. Capital income represents the returns to capital (plant, equipment, land, inventory, working capital, and other capital) used in a state. This is an important measure for capital-intensive sectors of the forest products industry, such as paper or engineered wood.

Figure 131. State & Local Tax on Capital Income, Selected States, 2003

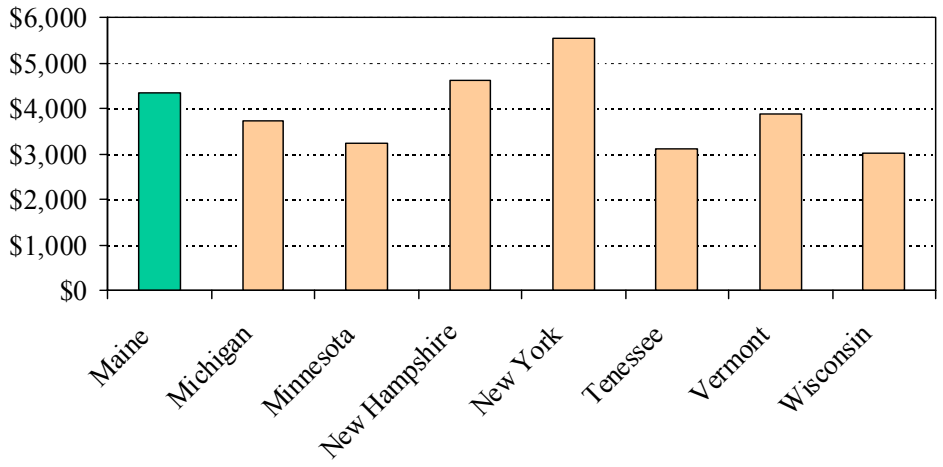


Data Source: Council on State Taxation

[166] Cline, Robert; William Fox, Tom Neubig and Andrew Phillips. *Total State and Local Business Taxes: A 50-State Study of the Taxes Paid by Business in FY2003*. Prepared for the Council on State Taxation. January 2004.

Again using information developed for the Council on State Taxation, taxes on a per-employee basis are high compared to other states, with Maine ranking as the eleventh highest cost state in the nation. For labor-intensive sectors of the state's forest industry, such as some secondary manufacturing, this is the important measure.

Figure 132. State & Local Taxes per Employee, Selected States, 2003



Data Source: Council on State Taxation

Personal Property Tax and Business Equipment Tax Reimbursement (BETR)

In Maine, the property tax applies to both real property (land and buildings) and personal property (for forest industries, this includes the machinery and other equipment used as part of the manufacturing process). At one point in history, when companies were tied to the local resource and transportation networks were not as extensive and inexpensive as they are today, this tax likely made sense. <u>However, the personal property tax now serves as a major disincentive to new investment in Maine's forest industries, which is a key to their future success and prosperity in the state.</u>

In an effort to address the negative impacts of the personal property tax, the legislature established the Business Equipment Tax Reimbursement (BETR) program, which provides companies with a state reimbursement for personal property taxes paid at the local level. This program has been critical in the decision of a number of forest products industries to make significant investments in Maine[167], and its importance cannot be underestimated. However, since its inception, the BETR has come under almost constant legislative attack. These attacks have been largely unsuccessful, but they have made both investors and company managers question the stability and longevity of the program.

In addition to concerns about the level of taxation, businesses have a concern about the stability of tax policy in Maine. Maine businesses make capital investments that last decades, but the BETR program is year-to-year, with no firm guarantee of continued existence. As noted in a report prepared for the Maine Center for Economic Policy:

> "[The] Business Equipment Tax Reimbursement (BETR) program was initiated to offset the negative effects on investment of local property taxation on business equipment. In theory, the state reimbursement does just that. However, continuous debate both about the merits of the program and delays in its funding have raised questions among some businesses about its continuity. This lack of predictability thus has an effect on investment quite apart from the rate of taxation or reimbursement."[168]

In the global environment, where capital investment is critical to continued competitiveness of the forest products industry, a tax on manufacturing equipment is a public policy that hinders the success of Maine forest industries.

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[167] Personal communication with John Williams, Maine Pulp & Paper Association, August 26, 2004.
[168] Lawton, Charles and Frank O'Hara. *Ranking Maine's Business Climate*. Prepared for the Maine Center for Economic Policy. July 2004.

Impact of State & Local Taxes on Commodity Products

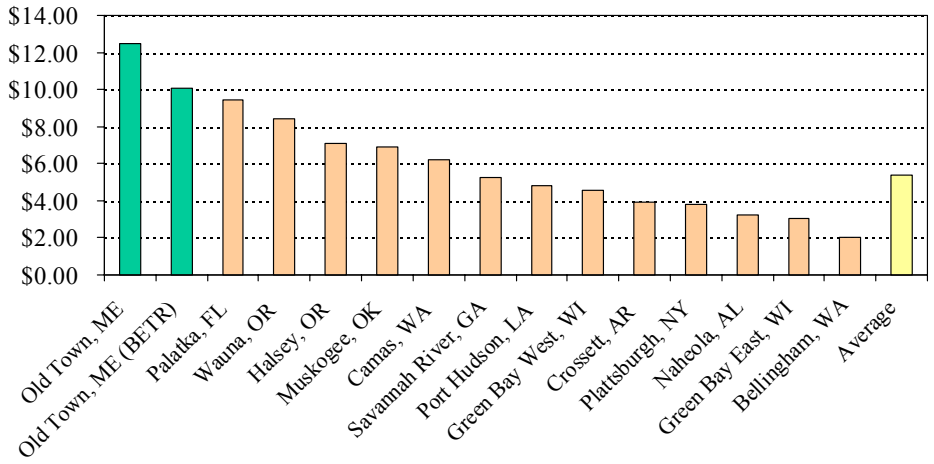
While important, state and local taxes are certainly not the only factor that impacts business costs. There are some that argue that business taxes are not as important as other factors in the location, reinvestment or success of a forest industry. However, they are a cost that state and local jurisdictions have *direct* control over, and can have a meaningful impact on the competitiveness of a forest industry.

Some recent data shows that for all Maine businesses, taxes collected at the state and local level are equal to 1.5% of the sales of all Maine businesses.[169] The implication that many draw from this is that taxes are not an important factor for the success of Maine businesses, including forest industries. This would be an incorrect conclusion. For commodity products, the vast majority of production from Maine's forest industry, price swings of a single percent or two can turn a venture from profitable to unprofitable. In the course of this work, we spoke with a number of firms that indicated that they had lost customers over less than a one percent change in price.

[169] Lawton, Charles and Frank O'Hara. *Ranking Maine's Business Climate*. Prepared for the Maine Center for Economic Policy. July 2004.

Georgia-Pacific, a paper company with mills in Old Town, Maine and around the country, prepared the following information on the taxes *per ton* of product produced at each of their facilities in 2001. This shows that, for the locations where Georgia-Pacific has operations, the taxes at the Old Town, Maine mill are higher *per ton of product produced* than anywhere else. This is true even when the impacts of the BETR program are accounted for. INRS has not independently verified this information, but believes it to be accurate and instructive on the comparative impact of taxes on Maine forest products.

Figure 133. Cost of State & Local Taxes *Per Ton*, Georgia-Pacific Facilities, 2001



Data Source: Georgia Pacific Corporation

In 2001, the cost of state and local taxes were $4.24 per ton higher than their average per ton tax. In a commodity market, where undifferentiated products are sold based largely on the price, a cost difference of this magnitude can impact the success of a facility.

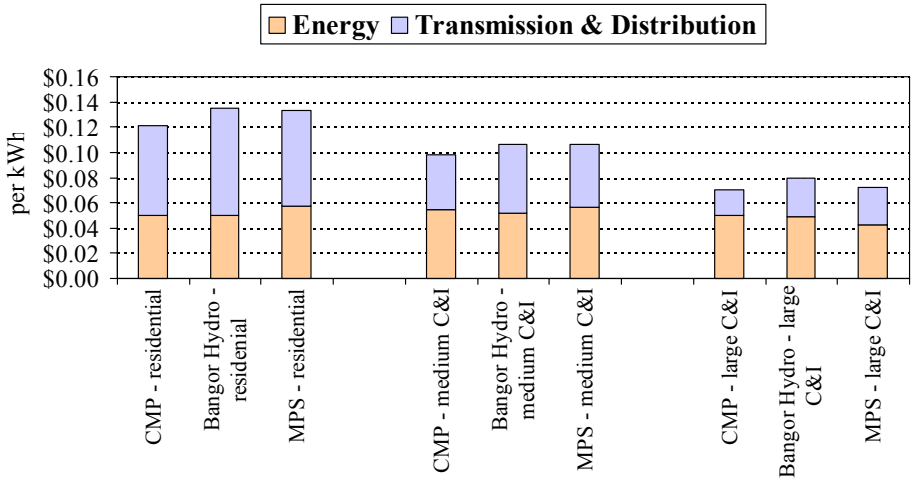
Energy Costs

New England has relatively high electricity costs when compared to the rest of the nation, and Maine is no exception. Maine has a restructured electric industry, where the Public Utilities Commission (PUC) regulates the transmission and distribution of electricity and consumers are free to select an energy supplier based on price or other factors.

For the regulated portion of a customer's electricity bill (transmission and distribution), the PUC approves rates that include the costs of building and maintaining the infrastructure needed to move electricity in and out of Maine and to consumers, as well as "stranded costs". These "stranded costs" are the cost recovery mechanism for uneconomic investments made during a time when electricity generation and distribution was wholly regulated. These costs vary by service territory (the company that provides transmission and distribution service), and are expected to decline in coming years.

Electricity rates can be determined by the volume of electricity used, the "shape" of the load (for example, is the electricity use steady, or does it vary over time in predictable or unpredictable ways), time of use, the source of the energy (for example, is it derived from a coal-burning facility or a wind farm), and other factors. The following shows 2004 rates by customer type and service territory. The energy costs are average; many forest industries may pay rates above these levels if they purchase the bulk or all of their energy during times of peak generation. It should be noted that the transmission and distribution rates are fixed, but customers may seek to purchase the energy from a number of sources, so that portion of the costs is subject to some level of variation. Most, though not all, forest industries would be considered medium or large commercial / industrial customers.

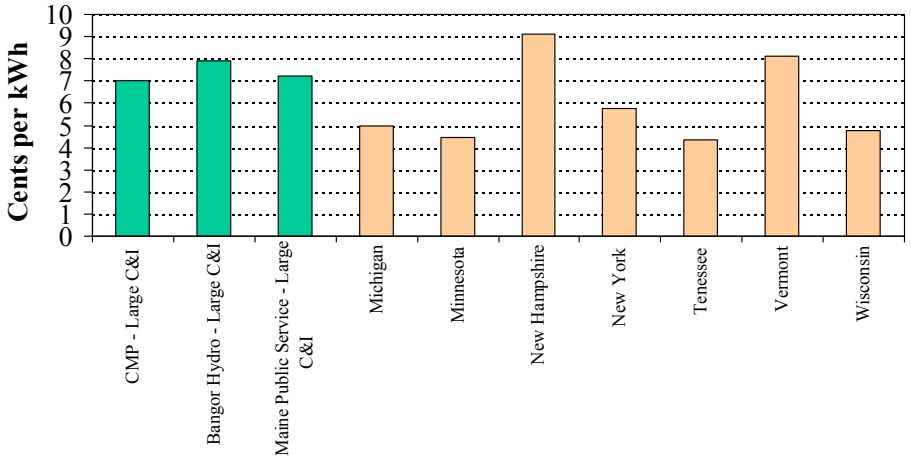
Figure 134. Maine Electricity Rates, by Service Territory and Customer Class, 1Q 2004



Data Source: Maine Public Utilities Commission

The rates paid for electricity in Maine are high compared to the national average, though are certainly not the highest in the region. Factors that contribute to the high cost of electricity in Maine and New England include the generation mix in the NEPOOL and NMISA regions, insufficient transmission capacity to most economically move electricity into and out of Maine and past investments in energy generation ("stranded costs"). The average rate paid by industrial consumers of electricity is reported regularly by the U.S. DOE Energy Information Agency. Comparing this data to rates paid in Maine service territories, Maine's electricity rate is higher than most regions and lower than some nearby states.

Figure 135. Industrial Electricity Rates[170], Maine Service Territories and Selected States, 2004



Data Sources: U.S. DOE, Energy Information Agency and Maine PUC

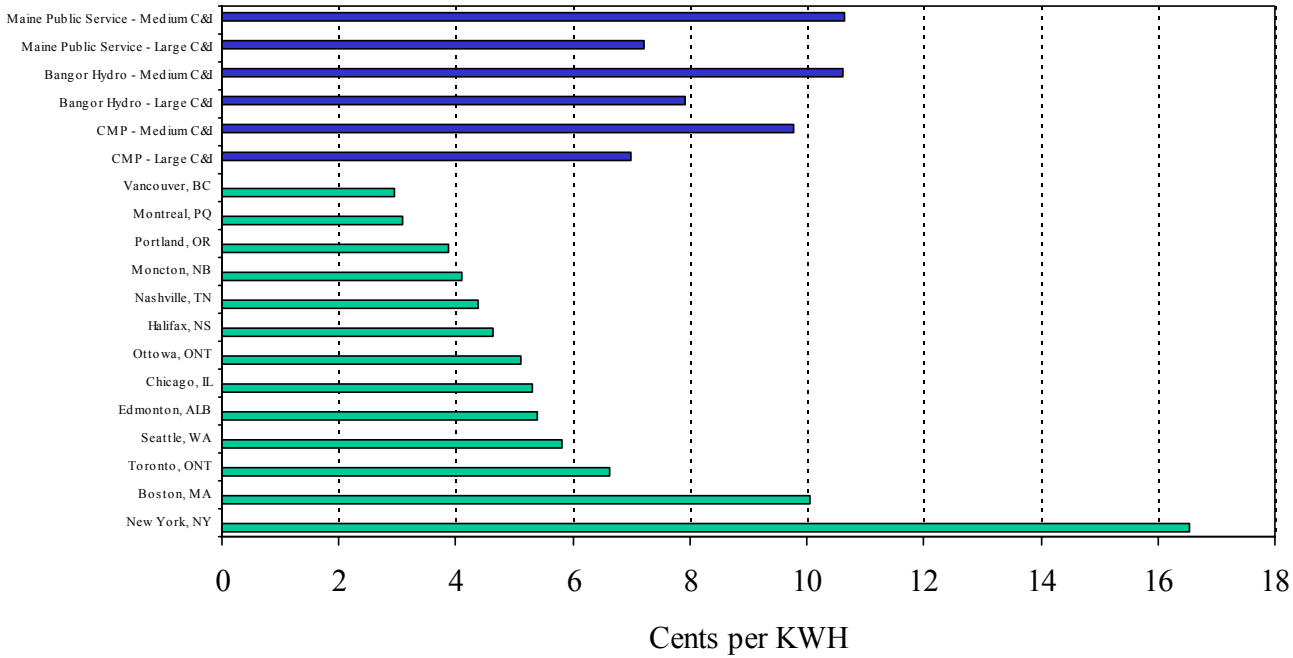
[170] "Electric Rates" includes energy, transmission and distribution costs.

Maine forest industries compete directly with a number of Canadian firms, both for raw material and in the marketplace. This is a cause of enormous frustration to many Maine industries, and the cost of electricity is often pointed to as one significant competitive advantage Canadian firms enjoy. This is particularly true of producers located in Quebec; due to its significant hydroelectric resources, Quebec enjoys the third lowest electric rates in North America[171].

The following chart shows how Maine electric rates for medium and large commercial and industrial customers compare to industrial electric rates in Canada and the United States.

[171] Transmission and Distribution World Magazine. *Hydro-Quebec: Brief Article.* December 2000.

Figure 136. Cost of 2003 Industrial Electric Rates[172], Selected U.S. and Canadian Locations (US$)



Data Sources: Maine Public Utilities Commission *and* BC Hydro

[172] "Electric Rates" includes energy, transmission and distribution costs.

TRANSPORTATION OF MAINE FOREST PRODUCTS

Transportation for Maine Forest Products

Overview

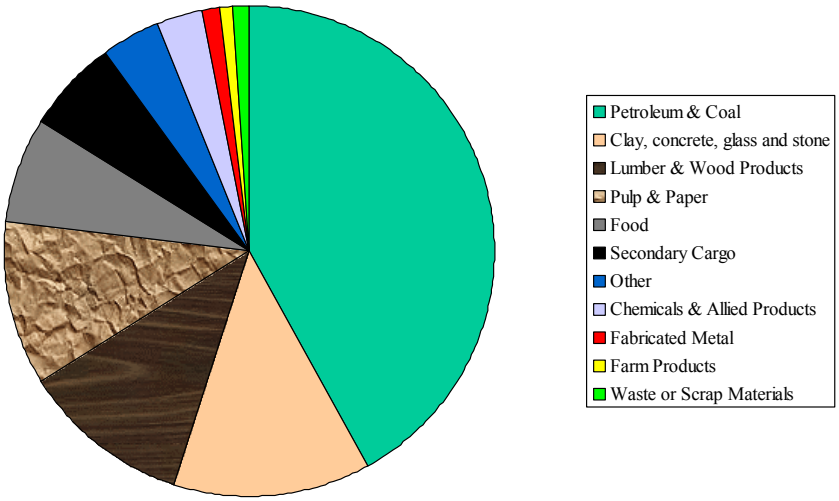
Recognizing that freight transportation is increasingly important to the management and growth of the region's overall economic vitality, the Maine Department of Transportation enlisted Cambridge Systematics in 2002 to develop an *Integrated Freight Plan* (IFP). This report follows the first Integrated Freight Plan, completed in 1998.

The goals of the 2002 IFP were to:

- Develop an updated freight profile for Maine reflecting changes to the freight transportation system and the evolution of the freight transportation industry;
- Build relationships with and identify the concerns of public and private freight stakeholders in the State; and,
- Recommend specific freight improvement projects and changes to Maine's freight planning program.

Freight transportation, important to all businesses, is crucial to the forest products industry, which relies on almost all modes of transportation but particularly truck and rail transport. For example, in 1998 the forest products industry accounted for two of the top four commodity groups in Maine. Among total commodity flows of 78.1 million tons in 1998, lumber or wood products (excluding furniture) accounted for 11 percent; pulp and paper products accounted for another 11 percent. The IFP projects these commodities to maintain their relative positions in 2006.

Figure 137. Top commodities in Maine, 1998



Data Source: Cambridge Systematics

Issues Relevant to the Forest Products Industry

The 2002 IFP found that the transportation infrastructure in Maine meets the basic needs of businesses, but with some inefficiencies, additional costs to shippers and receivers, and restricted modal selection. The state's highway systems is generally adequate, with the exception of some smaller highways that pass through small community centers and that have narrow segments and steep inclines. Highway access is generally good at the Ports of Portland and Searsport but landside access to the port of Eastport is limited. Some see highway access in Portland as being inadequate and this is being reviewed as part of a proposed connection of Interstate 295.

The IFP identifies institutional issues affecting freight transportation in Maine. Although rail plays a key role in the forest products industry, trucking also is very important to it and many other industries in the state. Approximately 87 percent of freight tonnage moving into, out of, and within Maine was moved by truck in 1998. Most relevant to the

forest products industry are specific issues such as truck size and weight regulations and lack of adequate and consistent rail service. Many respondents to surveys conducted for the IFP noted their desire for increases in the maximum truck size allowed on Maine roadways, particularly on I-95. Another trucking issue relevant to the state level was frustration with regulations that require permits for 53-foot trailers within the state. With the increased use of these trailers, many other states have removed permit requirements and some shippers and carriers feel that the permit creates unnecessary administrative burden not imposed by other states.

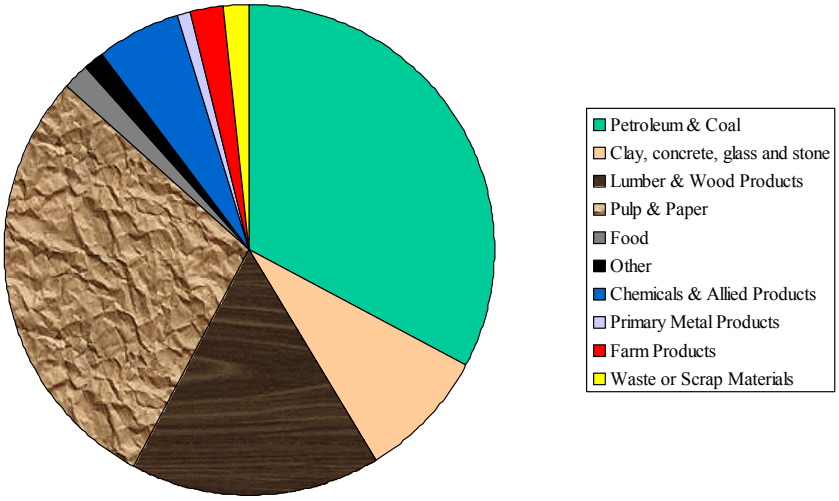
The Maine Department of Transportation (MDOT) Office of Freight Transportation is working with Maine's Congressional delegation and the Federal Highway Administration (FHWA) to address some of these concerns[173]. The weight limits, in particular, pose a significant trade issue because Maine's highways lie in a NAFTA freight corridor, with provinces and states to the north and south having higher weight limits than Maine. This creates impediments to trade flows in the region. In 1998 Congress provided an exemption to these weight limits and allowed Maine to enforce its state weight limits on the Maine Turnpike. A condition of this exemption was that the state undertake a study "analyzing the economic, safety, and infrastructure impacts of the exemption." In 2002, MDOT conducted this study in conjunction with the Maine Turnpike Authority and the New Hampshire Turnpike Authority and contracted with Wilbur Smith Associates to study the impacts of the federal exemption. The study found that if Congress removed the current weight exemption on the Maine Turnpike, the net impact for Maine would be an increase of 5.0 crashes annually with associated FHWA defined economic impacts of $443,000 per year. Similar results were found for New Hampshire, though with less impact. This is largely a result of keeping heavy trucks off smaller state highways and roads[174].

A trucking logistics issue is created by the fact that Maine produces more goods than it consumes, meaning that inefficiencies are created with trucks returning empty to Maine. These "deadhead" miles increase transportation costs for shippers, carriers, and consumers. This is a significant problem for forest product manufacturers.

[173] Personal communication, Rob Elder, Maine Dept. of Transportation, Office of Freight Transportation.
[174] Study of Impacts Caused by Exempting the Maine Turnpike and the New Hampshire Turnpike From Federal Truck Weight Limits. Study conducted by Wilbur Smith Associates, June 2004.

The forest products industry has unique transportation needs. In general, the industry produces low-value, high-volume commodities that depend on cost-effective transportation for their shipment. This makes rail transportation very important to the industry and this is reflected in transportation statistics. The IFP points out that by weight, more than half of the products moved in Maine by rail are related to the forestry industry (pulp and paper, lumber and wood products, chemicals and allied products, and clay).

Figure 138. Top Rail Commodities for Maine, 1998



Data Source: Cambridge Systematics

Institutional rail issues in Maine reflect national trends. The IFP survey of service providers and users indicated that poor rail service is a key issue for Maine's freight transportation system. Key issues include the lack of adequate and consistent rail service in the state. Six railroad companies serve Maine but many businesses do not have easy access to their services. The IFP notes that this is a result of abandoned rail sidings and short lines and lack of interest by the railroads in providing specific shippers with rail service. A further hindrance to efficient rail service in Maine is height restrictions that prevent the statewide operation of 286,000 pound rail cars and double-stack service in some areas. Some of Maine's regional and short line railroads have the ability to handle such cars and double-stack service offered along some corridors, there is no current strategy to address these and other rail infrastructure issue at a statewide level.

Rail is extremely important to the forest products industry but inefficiencies in the system create added costs. As the IFP points out, the forest products industry is the "anchor"

customer for the regional rail carriers. The three main regional railroads connect with Class I carriers, which connects them to points across North America in the U.S. and Canada. These three also have connections in Chicago, which is a major destination for rail and intermodal traffic. The Guilford Rail System serves most of Maine's paper and forest products industry with a scheduled service package tailored to each mill. It is the only carrier to directly service the Port of Portland. Although Maine has good connections to Class I carriers, Maine rail shippers must use multi-line rail service to reach distant markets. This can be more expensive and less timely because of the need to shift loads among different rail lines, rather than move products on a single railroad.

MDOT has also been working to address these issues. In particular, several sections of key rail infrastructure have been upgraded, in particular along the Montreal and Atlantic railroad line. Also, double-stack service is now available on the Auburn-Montreal and Montreal and Atlantic lines. The rail weight limits remain a concern because of outdated rail.[175]

Ports are also important to the forest industry. Maine has three main ports: Eastport, Searsport, and Portland. The primary customer of the port in Eastport is Domtar. Eastport is the deepest natural port in the United States and can accommodate ships with drafts of up to 64 feet. Furthermore, it is the closest U.S. port to Europe. Unfortunately, the port of Eastport lacks direct rail access, with the closest rail head 17 miles away at the Ayers Junction of the state-owned Calais Branch Railroad. A study of the feasibility of establishing one or more rail-to-truck trans-load facilities along the Calais Branch Railroad indicated that such a project might lead to slightly increased freight traffic through the port of Eastport. All three of Maine's major parts recently added significant warehouse capacity totaling approximately 160,000 square feet. These were added through a combination of private investment and public-private partnerships.

Conclusion

Freight transportation, important to all businesses, is crucial to the forest products industry, which relies on almost all modes of transportation but particularly truck and rail transport. These modes of freight transportation are generally adequate in Maine but demonstrate some inefficiencies due to a variety of institutional issues, including truck size and weight regulations, lack of adequate and consistent rail service within the state, railroad weight and height regulations, a significant amount of empty back-haul loads for trucks, and incomplete networks connecting ports to other modes of transportation. Maine's *Integrated Freight* Plan, developed for the Maine Department of Transportation, offers recommendations for addressing all of these issues.

[175] Personal communication, Rob Elder, Maine Dept. of Transportation Office of Freight Transportation.

FOSTERING AN ENTREPRENEURIAL CLIMATE IN MAINE'S FOREST INDUSTRY

Fostering An Entrepreneurial Climate in Maine's Forest Industry

Entrepreneurship is the thinking and mindset that allows individuals and companies to take risks, move into new markets, and grow. As Maine forest industries continue to face increased competition, issues unrelated to being a least-cost producer will be a key part of the success, growth, or even survival of many companies. In some forest industry sectors, Maine firms may find that "becoming cost competitive is impossible, or is not enough."[176] Factors related to customer service, managerial ability, entrepreneurial spirit, or employing the most appropriate business model may be critical to the success of Maine forest industries.

In Maine, an entrepreneurial approach to today's challenges faced by the forest industries will be a necessary component of future success. This is true not only of individual firms and the industry as a whole, but of state government as well. Some experts attribute "nearly 70 percent of economic growth [nationally] to entrepreneurial activity"[177]; for this reason it warrants specific discussion as related to the future of Maine's forest economy. The following is a discussion of how Maine forest industries and government can move to foster an entrepreneurial climate in the state.

Definitions

While discussions of encouraging and supporting entrepreneurial behavior are common, definitions are not. For that reason, the following definitions are offered to provide a common understanding of what is meant:

> *Entrepreneurship:* "the ability to amass the necessary resources to capitalize on new business opportunities. This term is used frequently to refer to the rapid growth of new and innovative businesses, and is associated with individuals who create or seize business opportunities without regard for resources under their control."[178]
>
> *Entrepreneur:* "one who organizes, manages, and assumes the risks of a business or enterprise. While an entrepreneur can be a small businessperson, not all small businesspersons are entrepreneurs. Entrepreneurial enterprises focus on new and innovative products and/or processes. They are growth-oriented and aggressively strive to capture market share. Entrepreneurial enterprises may begin as small businesses but often grow to be large firms, bringing wealth to their communities.

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[176] Schuler, Albert and Buehlmann, Urs. *Identifying Future Competitive Business Strategies for the U.S. Residential Wood Furniture Industry: Benchmarking and Paradigm Shifts*. USDA Forest Service Northeast Research Station General Technical Report NE-304. November 12, 2002.
[177] National Governors Association Center for Best Practices. "A Governor's Guide to Strengthening State Entrepreneurship Policy." 2004.
[178] National Governors Association Center for Best Practices. "A Governor's Guide to Strengthening State Entrepreneurship Policy." 2004.

> Entrepreneurs frequently reinvest earnings to expand their original enterprise or to create new ventures."[179]

Based on these definitions, it is clear that entrepreneurial behavior can occur in any size organization. While entrepreneurial behavior is often associated with small and micro businesses, the size of the organization is not nearly as important as its approach and attitude. Entrepreneurship is, above all else, an attitude adopted by businesses, government agencies, or other organizations that seek creative solutions to issues while eliminating unnecessary obstacles.

Entrepreneurship in Maine's Forest Industry Cluster

Maine's forest industry "cluster" includes a large number of sub-clusters, including pulp & paper, sawmills, wood product manufacturers, forest ownership and management, timber harvesting, and biomass power generation. "All of these sectors are highly interconnected and interdependent, with each sector playing a key role in maintaining the health of the industry."[180]

The state's overall economy is tied, in part, to the competitiveness and innovation of the state's forest industry cluster. Clusters grow and expand because of the innovation, knowledge and know-how that is generated and shared. A study completed in 2002 for the Maine Science & Technology Foundation noted that "the forest products industry demonstrates the strongest cluster characteristics of any sector in Maine."[181] The economic growth potential of industry clusters comes from the innovation of entrepreneurs who translate new ideas into business practices.

In order for Maine firms to fully realize their entrepreneurial potential, two separate but related groups must seek to build a climate of innovation: the forest industry, and Maine's state government.

Maine's Forest Industry Building Entrepreneurship

One of the best ways that entrepreneurs develop new ideas and build innovation is through the networks they develop. As noted by the Kauffmann Foundation in a report prepared for the State of Maine:

> "The existence of peer networks of entrepreneurs is a critical element of the continuous learning cycle associated with successful entrepreneurship. Until recently entrepreneurial networks in Maine were limited to trade associations that had historically focused more on advocacy than on individual development."[182]

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[179] Kentucky Innovation Commission. *A Strategic Plan for the New Economy*. March 2002.
[180] Colgan, Charles, Colin Baker, Nan Butterfield and Michael Cote. *Assessing Maine's Technology Clusters*. Prepared for the Maine Science & Technology Foundation. June 2002.
[181] Colgan, Charles, Colin Baker, Nan Butterfield and Michael Cote. *Assessing Maine's Technology Clusters*. Prepared for the Maine Science & Technology Foundation. June 2002.
[182] Ewing Marion Kauffman Foundation. *Promoting and Supporting an Entrepreneurship*

In Maine's forest industry, it is largely true that the existing trade associations are focused on advocacy and public policy, and have not put their efforts toward development of peer development and idea-sharing. This is appropriate, as the state's forest industries clearly desire a strong voice on legislative and regulatory issues. The existing organizations appear to serve this function well.

However, this focus on public policy -- as critical as it is to Maine's forest industries -- has not fully developed venues for idea sharing, professional development, peer learning, and networking. As a mature industry, many in Maine's forest industry may believe that this is not necessary, or will not provide them benefits.

As noted by Harvard Professor Michael Porter:

> "Trade associations can provide a forum for the exchange of ideas and a focal point for collective action in overcoming obstacles to productivity and growth. Associations can take the lead in such activities as establishing university-based testing facilities and training or research programs; collecting cluster-related information; offering forums on common managerial problem; investigating solutions to environmental issues; organizing trade fairs and delegations; and managing purchasing consortia."[183]

A number of individuals we spoke to as part of this research indicated that they seek information on a wide variety of topics, including anticipated changes in the marketplace, programs available to assist Maine industries, marketing of Maine forest products, and opportunities in the developing renewable energy marketplace.

It appears that there is an opportunity for Maine forest industries to create a forum – either within or external to existing trade associations – that could bring this information to industry leaders. If a forum like this is to start, it must come from within the industry, and it must meet the needs identified by Maine forest industries. It should *not* seek to replicate or replace the existing advocacy function played by Maine's forest industry trade associations, but should instead focus on the needs of forest industries that are best developed through information sharing and network development.

A good example of such an organization in Maine is the Environment & Energy Technology Council of Maine (E2 Tech Council). This organization is focused on the "creation of a communication, networking and information infrastructure that creates business development opportunities, provides technical assistance and increases knowledge regarding innovation."[184] Some Maine forest industries may benefit from

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-Based Economy in Maine. December 20, 2002.

[183] Porter, Michael E. "Clusters and the New Economics of Competition." *Harvard Business Review.* November – December 1998.

[184] www.e2tech.org Accessed on August 31, 2004.

participation in this organization or some of its events, and this organization may serve as a model for Maine forest industries seeking to learn about and share new ideas.

It must be noted that such a forum, like all trade groups, must be careful not to engage in any activity that would violate anti-trust laws. This includes any activities that would have potential competitors directly address or discuss "prices (including bids), costs, production capacities, credit standards, marketing strategies, market shares, customer or supplier classification, sales territories, sales policies, or any other matters covered by State or Federal antitrust laws."[185]

The sharing of success stories is also a critical part of developing an entrepreneurial culture, where firms publicly highlight their successful adoption of new ideas and business practices. This practice runs largely counter to the existing culture of Maine's forest industry, where innovations are kept close to the vest, and information sharing is often discouraged. Maine industries should work to identify what success stories can be shared, and find ways to do so. This has a number of benefits, including idea sharing within the industry and building of public confidence in the creative aspects of Maine's forest industry.

State Action to Build Entrepreneurship

As important and critical as forest industry action is to building upon the entrepreneurial climate in Maine, the state must also build a climate that welcomes new ideas. Many states believe that they want to encourage entrepreneurial development, but do so without adopting the attitude of an entrepreneur. As noted in a report prepared for governors across the nation, "State entrepreneurship policies appear more likely to succeed to the extent that states become as entrepreneurial as the clients that they serve."[186]

Based on conversations with a large number of "clients" of Maine state government – forest industries – it appears that Maine does not currently have what would be considered an entrepreneurial attitude. Maine forest industries report a number of frustrations with Maine state government, from unreturned phone calls to the perception of confusing and ever-changing regulations.

In a report prepared by the National Governor's Association Center for Best Practices[187], the following suggestions and observations are made about ways that state governments can build an entrepreneurial climate:

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[185] New Hampshire Sustainable Forestry Initiative SM Anti-Trust Statement, courtesy of the New Hampshire Timberland Owners Association.
[186] National Governors Association Center for Best Practices. "A Governor's Guide to Strengthening State Entrepreneurship Policy." 2004.
[187] National Governors Association Center for Best Practices. "A Governor's Guide to Strengthening State Entrepreneurship Policy." 2004.

- "A greater awareness of entrepreneurial businesses' sensitivities to regulations can help states maintain a more entrepreneur-friendly business climate and prevent regulatory missteps that disadvantage growth companies."
- "State laws and regulations should be streamlined with the goal of reducing the costs of regulatory compliance for entrepreneurs"
- "All businesses suffer when the cost of compliance with necessary state and local regulations is excessive or when regulatory processes are inefficient, duplicative, or non-transparent. A Byzantine system of business permitting and reporting around financial, environmental, unemployment insurance, and other requirements can diminish significantly a state's competitiveness. If complex and redundant permitting and reporting procedures plague businesses at the county or municipal level as well, the negative effects on business competitiveness can be multiplied."
- "Potential entrepreneurs may never undertake starting a business if regulatory barriers are too high. In such cases, early-stage companies may be tempted to move to jurisdictions where regulations are less burdensome."
- "States should pursue comprehensive reviews of rules and regulations to initiate reform efforts. Reviews may be focused on eliminating unnecessary or duplicative regulations, harmonizing state and federal regulations to reduce compliance burdens, or providing waivers or variances."
- "[States should] require that agencies analyze the economic impact of proposed new regulations and rules."
- "States should work to become more entrepreneur friendly, both symbolically and practically. Entrepreneurs value government officials and public leaders who recognize and communicate the importance of entrepreneurs' contributions to their communities, and who put this into practice by working to achieve greater efficiency through regulatory streamlining, uniformity, and transparent compliance practices."

Maine has taken positive steps to address some of these issues, including this effort (the Maine Future Forest Economy Project) and the Governor's Task Force on the Sustainability of the Forest Products Industry. Maine state government should be applauded for these and other efforts to address the needs of Maine industries. However, it would be a mistake to believe that these efforts alone, or recommendations from these efforts, will be enough to make Maine a place that is as welcoming of entrepreneurial thinking as possible. Developing an entrepreneurial climate is an ongoing process, not a checklist of tasks to be completed. Only by continually asking "what can Maine do to be more welcoming of entrepreneurs?" – and implementing ideas that flow from answering this question – will Maine fully realize its potential as a state that welcomes and encourages entrepreneurial thinking in all parts of Maine's economy, including the forest products industry.

Case Study – Business Plan Competition[188, 189]

In an effort to spur entrepreneurial thinking, some colleges or states have conducted "business plan competitions", with the winner receiving funding for the proposed business. In New Hampshire, Governor Craig Benson spearheaded such an effort last year, and four companies split a total of $250,000 in funding.

In New Hampshire, the effort was directed not specifically at forest industries, but at businesses in the biotechnology sector, financial services, and in the rural part of the state. The contest, entirely funded by a private donation[190], was overseen by a steering committee that included business school professors, business leaders, state officials, venture capitalists, and bankers.

Entrants were asked to submit a business plan (very little guidance was provided as to what constitutes a business plan), and all submissions were made on-line. A group of roughly two dozen judges – separate from the steering committee – was asked to rate and review the 211 submissions. In each category (biotechnology, financial services, and rural development) three finalists were selected to give presentations to a panel of judges. These presentations were made in public, with other investors and business leaders invited to listen.

This effort spurred entrepreneurial activity in a number of ways:

- Each of the award winners received funding, which was used to help start a new company or expand the offerings and activities of existing firms;
- A number of firms that participated in the presentations but did not "win" the competition were later contacted by lenders who judged or observed the presentations, and many of these firms received funding;
- At least two hundred and eleven (211) businesses and potential businesses went through the exercise of business planning, and had a document that they could use with lenders and other investors when discussing their business idea; and
- The organizers will never know how many individuals or firms began the exercise and dropped it because they discovered the idea did not make economic sense. While not leading to new business activity, knowing when not to pursue an idea is an important part of business growth and development.

[188] Personal Communication, Patrick McDermott, Public Service of New Hampshire, September 2, 2004.
[189] Personal Communication, Steve Boucher, NH Department of Resources & Economic Development, August 25, 2004.
[190] *Disclosure*: PSNH, the firm that funded this program, is a client of INRS on other issues.

Action Steps

As discussed above, there are a number of steps that Maine forest industries and government can take to better develop the state's entrepreneurial climate. It should be noted that this is an area where state government *cannot and should not* force industry action, and seeking to do so would run counter to the idea of developing an entrepreneurial culture in Maine's forest industry.

Maine forest industries, or individual sectors, may want to develop forums for the purpose of sharing new information and ideas, learning about potential trends and new technologies in the industry, and funding or technology transfer opportunities. Additionally, sharing of success stories could have meaningful benefits in terms of spurring innovative thinking elsewhere in the cluster and developing a public perception of the forest industry as creative and dynamic.

For state government, some of the details of how the state can be most welcoming of entrepreneurs are outlined above. All of these suggestions -- from streamlining state government, one-stop permitting, harmonizing state and federal regulations, and conducting economic impact assessments of pending regulations – get at one thing: developing a government structure that makes doing business in Maine as simple as possible. Maine has taken a number of steps in this regard, and these are positive developments. However, developing a climate that welcomes and supports entrepreneurs is an ongoing process, and Maine should continue to improve upon its good efforts to date.

EMERGING OPPORTUNITIES:
ROLE OF CERTIFICATION
CARBON MARKETS

Role of Certification

Introduction

Forest and related forest products manufacturing certification (certification[191]) programs have grown exponentially since their initial introduction in North America in the early 1990s. Their true effect in the marketplace, and their bottom-line effects, are less certain, however. Maine has been the leading U.S. state in implementation of certification programs.

History of Certification

It is important to understand that the roots of modern certification lie early in the 20th century, beginning with early concerns about timber famines and subsequent threat of federal forest practice regulation in the 1930s. One outcome of those early concerns was the creation of the American Tree Farm System in 1940 and the first certified Tree Farm (Weyerhaeuser) in Washington State in 1941.

More recent source issues for certification began with the worldwide concern for tropical deforestation by the International Tropical Timber Organization (ITTO) in the 1980s, and subsequent failure of voluntary European tropical log importation bans. This was soon followed by the Earth Summit (UN Conference on Environment & Development) in Rio de Janeiro in 1992, which resulted in Agenda 21 for sustainable economic development and Statement of Forest Principles. Soon after, regional governmental processes as follow up to the Rio summit resulted in the Montreal Process (Criteria and Indicators for forest sustainability for North American temperate forests) and the Helsinki Protocol, a similar set of criteria for European temperate forests.

The Forest Stewardship Council (FSC), a non-profit entity founded by the environmental community along with some forest products industry leaders, was founded in 1993 to address the growing concern for unsustainable forest practices in tropical forests. Today, the FSC is one of the largest worldwide forest certification programs based on their 103 million acres of certified land worldwide.

In 1995, the forest products industry in the United States launched its own program, the Sustainable Forestry Initiative (SFI). The early program, with self-verification as its core, resulted from the industries interest in improving its image and "social license" to practice forestry in the United States. Concern for the proliferation of state forest practices acts and related regulation, in part, prompted this "self-policing" approach in improving practices through an industry-based program. In 1999 it became a full

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[191] *Certification* here means forestlands verified to a sustainable forestry standard by an independent third-party audit. The term also refers to the related tracking system of wood coming from certified forests (called chain-of-custody by some systems) or log procurement systems for forest products manufacturing under the Sustainable Forestry Initiative. ISO 14001- type process certification which, when not coupled with a sustainable forestry standard, usually do not lead to certified products in the market, are not included.

certification program with the advent of third-party auditing requirements. The SFI is closely linked to the ISO 14001 Environmental Management System standard – a program that certifies a company or entity system for environmental issues management. The SFI covers the U.S. and Canada. In Canada, the Canadian Standards Association (CSA) launched a forest certification standard in 2000. The CSA program covers Canada and is closely connected to ISAO 14001.

Many other certification programs have been launched, chiefly in Europe, Australia and New Zealand and Malaysia, among other locations. Many of these systems are now certified under the umbrella Programme for the Endorsement of Forest Certification Schemes (PEFC) – a program that requires the certification systems themselves to meet a certain standard focused on both process and content issues.

An historical look at certification would be incomplete without at least a notation about the role the environmental community has played in the development of forest certification. Especially in the earlier years of certification in the 1990s, large portions of the worldwide environmental community supported only one certification system – the FSC. In the U.S. this has also been true and, the more radical members of the environmental community have not only supported FSC, but have also spent significant resources voicing strong public concerns about other certification systems – chiefly the SFI. While those concerns have lessened as the various certification systems have evolved, there remains a strong preference by the environmental community for the FSC.

While the initial concerns for the conservation of tropical forests resulted in the creation of several of the early forest certification systems, this issue is no longer driving certification. Temperate forests now make up the majority focus of certification in the world. As yet, recognition of forest certification and demand of any significance for products from certified forests by the consumer is negligible worldwide. Studies show (see next section) that awareness and demand at the consumer level is likely strongest in the United Kingdom.

Status of Certification

Approximately 235 million hectares (587 million acres)[192] of the world's forests are currently certified by one of the major certification systems -- primarily Forest Stewardship Council (FSC) worldwide, Sustainable Forestry Initiative (SFI) in the United States and Canada, Canadian Standards Association (CSA) in Canada only, Programme for the Endorsement of Forest Certification Schemes (PEFC) worldwide (formerly Pan European Forest Certification system) and the American Tree Farm System (ATFS) in the United States. This acreage has grown by over 100 million hectares in the last 16-18 months, from 2003 to late 2004. In 1999, certified acreage worldwide was less than 20 million hectares or 50 million acres (primarily FSC).

The PEFC is a system to certify national certification systems, so it includes many different national systems in Europe and elsewhere. The American Tree Farm System, directed primarily at family forests or smaller acreages, is not a true third-party system but a new group certification sub-program of the ATFS is.

Worldwide, the major forest certification programs currently have approximately the following acreages under certification: FSC – 106 million acres; PEFC – 130 million acres; SFI – 94 million acres; ATFS – 33 million acres (mostly second-party certified under their Tree Farm Inspector program).

Geographically, more than 90% of the total forest area certified in the world is still in the northern hemisphere, with about half of the certified forest area located in Europe and over 40% in North America. Developing countries account for only around 10% of the total forest area certified – mostly plantations in Brazil, Gabon and South Africa. This imbalance between developed and developing countries has changed rapidly. In 1996 the share of the total in developing countries was approximately 70%[193].

In Maine, the first certified acreage was the 970,000-acre Pingree Heirs ownership certified to the FSC Standard in 1992 (the second certified ownership in the United States).

[192] Ben Gunneberg, Secretariat-General, Programme for the Endorsement of Forest Certification Schemes, in a presentation at The Sustainable Forestry Initiative Program 2004 Annual Conference, Austin, Texas, September 22, 2004.
[193] Forest Products Annual Market Analysis 2002-2004, United Nations, Geneva, 2003

In Maine today, the certified forest acreage is as follows[194]:

Landowners and Mills in Maine with Third Party Certification of Sustainable Forest Management

	Acres	Certification or Verification System			
		FSC	SFI	ISO	Tree Farm
Certified Landowners					
Baskahegan Land Company	101,000	X			
Baxter State Park Scientific Forest Management Area	29,600	X☐			
Bayroot Timber LLC	500,000				
Hancock Land Company	33,000	X			
International Paper Company	1,205,000		X	X	
Irving Woodlands LLC	1,550,000		X	X	
Maine Department of Conservation Bureau of Parks and Lands	485,000	X☐	X		
NexFor / Fraser Papers	238,000		X☐	X	
Non-Industrial Private Forest Landowners	300,000				X
Plum Creek Timber	953,492		X☐		
Robbins Lumber	30,000		X		
Seven Islands/Pingree Associates	941,000	X	X		
The Nature Conservancy	170,000	X			
Typhoon LLC	430,144		X		
Certified Land Managers for Multiple Landowners					
Mid Maine Forestry	7,042	X☐			
Two Trees Forestry	17,228	X☐			
Hancock Land Company	1,000	X☐			
New England Forestry Consultants, Inc		X☐			
Group Certifications					
SWOAM – ATFS Group	30,000				X

[194] ME Department of Conservation website and follow-up communication, January 10, 2005

	Acres	Certification or Verification System			
		FSC	SFI	ISO	Tree Farm
Certified Mills					
A.E. Sampson & Son, Ltd		X			
Columbia Forest Products		X			
Georgia Pacific Corporation			X		
Louisiana-Pacific Corporation			X		
J. M. Huber Corporation - Wood Products			X		
H. A. Stiles Company (HASCO)		X			
International Paper			X		
Maine Ornamental Woodworkers, Inc.		X			
Maine WoodNet Certified Group		X			
Maine Woods Company LLC		X			
MeadWestvaco[195]			X		
SAPPI			X		

[195] On January 18, 2005 Mead Westvaco announced plans to sell its paper division, including the mill in Rumford, to the investor group Cerberus Capital Management L.P.

Governor Baldacci Initiative

In June of 2003, Maine Governor John Baldacci launched the Maine Forest Certification Initiative. According to the Governor's announcement on the effort, the purpose of this initiative was to "help grow Maine's forest industry by distinguishing Maine products in the marketplace while improving forest management on the ground."

Maine has the highest percentage of certified forestland in the nation at approximately 35%. Striving to be the leading state in forest certification may provide market advantages to Maine but more must be done than just adding certified acreage. An obvious non-market benefit to the public includes more sensitive forest management being implemented. The Governor said in his release on the effort that "certification has been a significant force for improving forest management in Maine, increasing the attention paid to balancing harvest with growth, maintaining water quality, and achieving other environmental objectives."

Governor Baldacci also intended the Maine initiative to lessen the need for additional forest management regulations, using, instead, a market-based approach.

The core of the initiative is "to increase the amount of certified forestland in Maine from 6.5 million acres to at least 10 million acres by the end of 2007."

The Governor also identified several actions that would be taken by the State to help achieve this goal, including:

1. Certifying actively managed State lands, including approximately 100,000 acres managed by the Department of Inland Fisheries and Wildlife;
2. Giving preference in State purchasing to certified wood and paper whenever practicable;
3. Providing technical assistance, outreach, and encouragement for landowners large and small seeking to become certified;
4. Providing preference in Maine Forest Service cost share programs for landowners, resource managers, and loggers entering certification systems;
5. Paying part of the cost for foresters to become certified resource managers, and encouraging the expansion of the Master Logger Certification Program and the Small Woodland Owners Association of Maine's initiative to enroll small woodland owners in the Tree Farm Program using Tree Farm's new 2004 standards.

Prospects for the Future of Certification

In 2004, demand for Certified Forest Products (CFPs) by private end consumers remains an insignificant factor in the worldwide market for these products. Nevertheless, worldwide, general consumer sentiment on deforestation, forest degradation, loss of biodiversity and, notably, on tropical deforestation, keeps the sector under pressure to act.[196] Wholesale markets for wood and paper products, however, are increasingly demanding certified product although price premiums for certified product are not significant.

Research also shows that, other things being equal, consumers in the U.S. and elsewhere prefer CFPs over identical non-certified products[197].

The United Nations *Forest Products Annual Market Analysis 2002-2004* describes this consumer end challenge:

> "Forest certification is increasingly becoming a main instrument for communication on sustainable forest management throughout the forest and trade sectors, with enhanced public relations efforts by programmes such as PEFC. However, consumer awareness of even the longest established logo on Certified Forest Products, that of the FSC, is still low in markets such as those in Germany, then Netherlands and Austria, with somewhat higher rates of logo recognition in more established markets, such as the United Kingdom, where increased logo recognition has been claimed by FSC, based on data from surveys. In Eastern Europe, the driving force for certification is not domestic consumer demand, but export markets and demand by certain major retailers. This retailer-driven demand can also be recognized in North America, although, according to experts, certification is not necessary for market access, and will not be in the near future. Many players active in the market see the lack of consumer awareness and interest as a major obstacle for market growth."

One consumer sector that is creating additional demand for CFPs worldwide (including in the U.S.) is the government market sector. Several national Governments in European markets, including those of the United Kingdom, the Netherlands, Denmark, France and Germany, have announced public procurement policies that include criteria favoring the purchase of CFPs, notably from tropical countries. Similar policies exist at municipal levels in several European countries. The United Kingdom Government was one of the first to set up a procurement policy and issue a guidance document on timber procurement in 2000.

Governor Baldacci's policy on state procurement of CFPs is one example of growing programs in the U.S. In 2003 and 2004, the City of New York developed its own

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[196] Forest Products Annual Market Analysis 2002-2004, United Nations, Geneva, 2003

[197] Anderson and Hansen (2003). "Do Forest Certification Ecolabels Impact Consumer Behaviour? Results from an Experiment"; Research brief, May 2003, *Wood Science & Engineering*, Oregon State University.

procurement policy on wood and paper products, giving preference to certified product. More can be expected in the U.S. on this front.

Severely lacking worldwide, however, is advertising and marketing plans to develop product brand awareness of certified forest product by consumers. The Forest Stewardship Council has used well-known U.S. celebrities such as Jennifer Lopez to push its certified brand – though a sustained effort has not been seen. The backing organization that created the Sustainable Forestry Initiative, the forest products trade group American Forest and Paper Association, had developed a substantial multi-million dollar marketing program for its SFI brand in 2002 but never implemented it due to concerns over environmental organization protests with its on-product-label that was launched around that time.

While certification in the northern hemisphere seems to be reaching new plateaus, the situation in the tropics (where certification genesis really began) is much less sure. Growth in certified acres will not mirror that in the northern hemisphere. Government roles may be different there than in the north as illegal logging and lack of regulated business infrastructures make using private, market-based certification systems more difficult due to the plethora of opportunity for fraud and corruption.

Potential Benefits to Maine Forest Products Industry

Forest certification has already yielded market benefits to Maine companies as at least one paper buyer for Time Inc. has stated in no uncertain terms that his company is purchasing more paper (in a reduced demand market) from Maine than before simply due to the large percentage of certified forested acres[198]. For most other markets, however, it is unclear what benefits certified forest products will yield to companies and the state as a whole.

Clearly forest management has improved on-the-ground in this surge of certified acres over the last 5 years especially, when certified acreage increased by several fold. All the major certification standards include clear criteria that address sustainability factors such as biodiversity conservation, special places conservation, water quality improvement, wildlife habitat protection and timber sustainability, among others. Mainers can be assured that these programs have made a difference in the future sustainability of the forests of the Pine Tree State. But will the programs themselves be sustained, thereby assuring this continuing conservation concern? Markets are key to trying to answer this question.

Most certified landowners will agree that market pull (even at the wholesale level) for certified product is meager at best. Maine's first acre to be certified was in 1992 – twelve years ago. The market potential for certified forest products was highly touted then and still may be realized, but not without serious action. Companies that have made the

[198] David Refkin, TimePaperCo at Blaine House Conference, November 17, 2003

commitment to certification need to see substantial changes in certified product market pull in order to stay in the certified forest game.

Several key actions are needed to realize the potential that exists for Maine certified forest products:

1. State government in Maine needs to get very serious about its interest in being a certified product consuming market leader. Very specific certified product purchasing targets must be set and met beginning immediately.

2. Maine certified companies must pressure the certification programs (chiefly the Forest Stewardship Council and Sustainable Forestry Initiative) to invest in serious marketing of these programs and their brands to the consuming public.

3. Maine state government should develop its own marketing initiative to reach consumers in Maine and surrounding states and provinces, at least.

4. Maine state government should continue to work with entities involved in the certification of small acreage lands (family forest owners) but should act as facilitator only in order to keep the certification programs private and market driven.

5. The private sector needs to increase the number of mills that are certified under the various certification programs because in order to get certified forest products from the woods to the marketplace, certified mills are an essential pass-through point.

Conclusions

Forest certification continues to grow in the northern hemisphere but lack of consumer awareness of the programs and the values they deliver may cause certification reductions in the next five years. The key actions needed to prevent a peaking of this market-based phenomenon is aggressive marketing to wholesalers and especially consumers by all involved parties. Certification may provide opportunities to distinguish Maine forest products in the marketplace regionally and globally, but not without very active participants working to create significant consumer pull.

Emerging Opportunities for the Forest Products Industry from Carbon Sequestration

Emerging opportunities may exist for the sequestration of carbon in U.S. forests as part of a strategy to mitigate greenhouse gas emissions. Unfortunately, there is no true "market" for greenhouse gas emissions reductions in the U.S., meaning that investments in actions to increase carbon sequestration or to offset greenhouse gas emissions remain speculative.[199] As markets develop, however, the forest products industry may be in a position to benefit from carbon sequestration because processing wood into long-lived products such as lumber and furniture can enhance carbon sequestration from terrestrial ecosystems.[200] Furthermore, wood consumption in the U.S. increased to 18.1 billion cubic feet in 1997 from 12.1 billion cubic feet, offering an opportunity to leverage the environmental benefits of wood products to a growing consumer base.[201]

Opportunities

In addition to the long-lived nature of many wood products, wood possesses characteristics that make it an attractive alternative to other materials such as steel, plastics and concrete. Wood products have two main advantages: the first is that they are produced from a renewable resource. The *net* emission of carbon dioxide to the atmosphere from burning wood is zero, if the area producing the wood is managed sustainably. This is because new growth in a sustainably managed forest will sequester carbon to offset emissions. Second, wood products often require less energy in their production.[202] As the tables below demonstrate dramatically, wood shows much less environmental impact than steel in the areas of energy consumption and air and water pollution.[203]

Energy Consumed in Manufacturing Wood *vs.* Steel-Framed Interior Walls (GJ)		
	Wood Stud Wall	**Steel Stud Wall**
Extraction	0.7	1.2
Manufacturing	2.1	9.7
Construction	0.6	0.6
Total	**3.4**	**11.5**

[199] Peter Zaborowsky and Jeffrey Reamer. Reality check for the U.S. GREENHOUSE GAS market. *Evolution Markets Executive Brief*. 2004.
[200] Northeast State Foresters Association. Carbon sequestration and its impacts on forest management in the Northeast. December 19, 2002.
[201] Edited by Michael Strigel and Curt Meine. Report of the intelligent consumption project. A collaborative project of the Wisconsin Academy of Sciences, Arts and Letters. USDA Forest Service, Forest Products Laboratory. May 2001.
[202] Peterson, A.K. and B. Solberg. Substitution between floor constructions in wood and natural stone: comparison of energy consumption, greenhouse gas emissions, and costs over the life cycle. *Can. J. of For. Res.*, 33: 1061-1075. 2003.
[203] Doug MacCleery. *Resource Consumption, the Land Ethic, and NIMBYism*. Presentation to the New England Society of American Foresters, March 18, 2003.

Air Pollution Produced in Manufacturing Wood *vs.* Steel-Framed Interior Wall		
Emission/Effluent	**Wood Wall**	**Steel Wall**
CO2 (kg)	305	965
CO (g)	2,450	11,800
SOX (g)	400	3,700
NOX (g)	1,150	1,800
Particulates (g)	100	335
VOCs (g)	390	1,800
Methane (g)	4	45

Water Pollution Produced in Manufacturing Wood *vs.* Steel-Framed Interior Wall		
Emission/Effluent	**Wood Wall**	**Steel Wall**
Suspended Solids (g)	12,180	495,640
Non-ferrous metals (mg)	62	2,532
Cyanide (mg)	99	4,051
Phenols (mg)	17,715	725,994
Ammonia (mg)	1,310	53,665
Halogenated organics (mg)	507	20,758
Oil and grease (mg)	1,421	58,222
Sulphides	13	507

Some analysis of energy and material use comes from the methodology of Life Cycle Analysis, or LCA. LCA accounts for resource use and emissions from production, use, and waste handling of materials, also known as a "cradle to grave" analysis.[204] Analyses of energy use and cost-effectiveness of wood products are not yet well developed, however, researchers are beginning to show that wood is often a good alternative to other materials. For example, a recent study shows that floor covering in solid oak produces less greenhouse gas emissions than products such as linoleum, vinyl, carpet in polyamide, and carpet in wool.[205] The authors note that wood tends to be more expensive than these alternatives but that cost considerations could be offset by taxes on greenhouse gas emissions (N.B., these taxes do not currently exist, and are not a leading part of current U.S. policy dialogue). Another study by the same authors shows that wood flooring is more energy intensive than stone flooring but that the wood option has lower greenhouse gas emissions.[206] More work remains to be done on the potential for substitution of other materials with wood products. Much depends on the type of wood product, its longevity, and its disposal at the end of its life, particularly whether the product is disposed of in a landfill or burned.

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[204] Peterson, Ann Kristin and Birger Solberg. Greenhouse gas emissions and costs over the life cycle of wood and alternative flooring materials. *Climatic Change*, 64: 143-167. 2004.
[205] Peterson, Ann Kristin and Birger Solberg. Greenhouse gas emissions and costs over the life cycle of wood and alternative flooring materials. *Climatic Change*, 64: 143-167. 2004
[206] Peterson, A.K. and B. Solberg. Substitution between floor constructions in wood and natural stone: comparison of energy consumption, greenhouse gas emissions, and costs over the life cycle. *Can. J. of For. Res.*, 33: 1061-1075. 2003.

Challenges

Three main challenges exist for the forest products industry to take advantage of markets for carbon sequestration. First, LCA of forest products is still in its infancy and the cost-benefit advantage of wood over other products is not always straightforward. Second, there is no recognized accounting system that certifies the amount of carbon stored in wood products. Third, accounting for carbon in wood products is predicated on predictions about the longevity of any particular wood product. Statistics on the production and international trade rates of wood products are compiled, but little is known about the decay and disposal rates of harvested wood products.[207] Additionally, the use of wood residues as bioenergy could be better utilized to displace fossil energy. One study shows that these factors may be more important in the total greenhouse gas balance of utilization of wood products than the carbon sink impact.[208]

Outlook

Evidence that markets for carbon sequestration will benefit producers of wood products such as sawmills and other manufacturers remains limited and mostly anecdotal. There is growing evidence that for many purposes the production of wood products is more energy efficient and the products longer lasting than other materials, however, use of wood is dependent on cost-competitiveness. Additionally, relatively little is known about the longevity of various wood products. Still, increased use of wood-based products could be one of the many pathways for increasing carbon sequestration and mitigating greenhouse gas emissions. In the short term, opportunities exist to market the energy efficient aspects of wood products for certain uses. In the longer term and if markets for carbon sequestration develop, opportunities may exist to market the role of wood products as carbon sinks and hence as a pathway for greenhouse gas emissions avoidance.

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[207] Pingoud, K., et al. Carbon dynamics in wood products. *Mitigation and Adaptation Strategies for Global Change*, 6: 91-111. 2001.

[208] Pingoud, K., et al. Carbon dynamics in wood products. *Mitigation and Adaptation Strategies for Global Change*, 6: 91-111. 2001.

STATE INITIATIVES TO SUPPORT AND GROW FOREST PRODUCTS MANUFACTURING

State Initiatives to Support and Grow the Forest Industry

Overview

Activities to support and grow the forest industry nationwide – from both a public policy perspective and an industry action perspective – can be characterized in two ways. First, there are traditional economic development strategies aimed at marketing, training, and various approaches aimed at stimulating investment in all levels of the industry. Second, there are emerging efforts such as "cluster-based" approaches to economic development and efforts to explore and support new markets such as certified forest products, renewable energy, and to exploit technologies such as the Internet to create more efficiency in markets.

Traditional Industry Support

Several states are attempting to highlight the importance of the forest products industry to their local, state and regional economies. For example, the North Carolina Forestry Association produced a report, *The State of Our Forest Products Industry*[209], in October 2003 that provided an assessment of the industry with many recommendations on how to strengthen and grow it. Unfortunately, few of the recommendations have been implemented due to be a combination of existing negative perception of the industry as well as logistical challenges with the state's legislative calendar.[210]

The South Carolina Forestry Association is pursuing a similar strategy of collaboration and meetings. Michael Porter, an expert in competitive strategy at Harvard Business School authored a study, the *South Carolina Competitiveness Initiative*[211], last year that characterized the forest products industry as a low growth industry but one of several potential bases for developing strong clusters.[212] The Association sees opportunities in developing the cluster concept used in the report.

Other efforts attempt to quantify the economic impact of the industry. The state of Minnesota conducted a study to show the multiplier effect of the forest industry on the basis of impact per dollar of timber sold. This work was funded by the U.S. Forest Service and contracted to the state Department of Employment and Economic Development.[213] The study is being used to highlight the economic impact of the industry among a diverse group of stakeholders including legislators, county land commissioners, and communities.[214] A similar study has been completed for Indiana.[215]

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[209] http://www.ncforestry.org/15593_NCF.pdf (Last accessed: 9/10/2004)
[210] Personal communication, Bob Slocum, North Carolina Forestry Association.
[211] http://www.centralmidlands.org/pdf/monitor.pdf (Last accessed: 9/9/2004)
[212] Personal communication, Guy Sabin, South Carolina Forestry Association.
[213] Personal communication, Stephen Bratkovich, Forest Products Specialist with USDA Forest Service, S&PF.
[214] Personal communication, Keith Jacobson, Division of Forestry, MN Dept. of Natural Resources.
[215] The *Northeast State Foresters Association* completes similar analysis for the states of Maine, New Hampshire, Vermont and New York.

Industry promotion efforts tend to be led by public agencies with an interest in expanding either wood utilization in the state (e.g., state departments of natural resources) or employment and tax base (e.g., state departments of commerce). Successful industry promotion efforts are the result of long-term cooperative efforts between mid-level staff in their respective state agencies, whether or not originated at higher levels in their organizations or by the governor. Although initiatives at higher levels were sometimes helpful in instigating such cooperation, it does not appear to be either a necessary or sufficient condition for success.

The major issues in industry promotion are "business climate" topics such as tax rates, employment laws, energy costs, transportation infrastructure, and especially environmental regulation, all of which affect a wide variety of business sectors. Wood availability is also an important factor, but not as great as might be expected since new, low-cost producers can often displace older, higher-cost producers in competing for a wood resource. Environmental regulation can be highly variable between states and can be dealt with on a sector-by-sector basis through a combination of technical assistance and simplification of permitting procedures without relaxing and potentially improving actual environmental performance.

Direct sales, through activities such as promotional efforts at trade shows, can have a significant effect on promoting timber product exports from a state, especially of higher quality, specialized, non-commodity items. After improving business climate, such efforts are also very effective in drawing new industry into a state, especially if all relevant state departments or functions (addressing wood resources and business climate) are present offering information and visibly cooperating with one another.

Several states offer services through utilization and marketing (U&M) specialists. These individuals provide a variety of services that are most popular when they focus on activities such as technical assistance to existing industry to improve processes that lower costs, improve volume and grade recovery, add secondary processing, or improve business methods to increase profits and market share relative to competitors in other states. Typically, these efforts are most meaningful to the smaller-scale sawmilling sector than to the larger scale and more integrated pulp and paper sector, where firms conduct their own research.

Case Study – Great Lakes Wood Manufacturing Partnership[216]

Located at the University of Minnesota – Duluth, the *Great Lakes Wood Manufacturing Partnership* (GLWMP) is designed to enhance the competitiveness of the wood products industry in the Western Great Lakes region of Minnesota, Michigan and Wisconsin by completing company-specific projects. They accomplish this through the implementation of "Lean Manufacturing" principals and product development for wood-using companies.

With the majority of its current funding from the National Science Foundation, the GLWMP works with individual companies to implement continuous improvement strategies to the wood manufacturing process. They implement a process known as "Lean Manufacturing", which focuses on:

- Systematic removal of waste;
- Reducing costs and shortening cycle time between customer order and ship date;
- Creating a culture in which everyone is continually improving process and production.

In an example provided for one company who used the services of the GLWMP, reported results included:

- Process lead time decreased by 66%;
- Floor space used decreased by 42,000 square feet;
- Productivity increased by 240%;
- On-time shipping improved from 95.2% to 99.3%;
- A significant increase in product offering; and
- In-sourcing of previously purchased items.

The GLWMP reports a number of similar successes, and anticipates a growing regional role. Going forward, the organization's focus will be on developing public-private partnerships that support wood-using manufacturers:

- Cooperatively providing assistance to companies in adoption of best manufacturing practices, introduction of new technology and development of new products;
- Promoting innovation by training wood specialists in lean manufacturing and group facilitation;
- Creating a model for future ties between state agencies, economic development organizations and private wood products businesses.

[216] Brashaw, Brian K. "Enhancing Competitiveness Through Lean Implementation: The Great Lakes Manufacturing Partnership." *Manufacturing Competitiveness of the Forest Products Industry: Competing in Today's Global Manufacturing and Consumer Marketplace.* New Orleans, LA. November 4, 2004.

The success of these “traditional” U&M efforts is tied closely to federal assistance in identifying issues, spearheading initiatives, establishing technical assistance templates, holding regional workshops, and training and securing federal funding for state-level staff. These federal initiatives are usually tied to strategic resource utilization and protection issues. The last such major effort was the 1970s Sawmill Improvement Program which focused on milling and drying technical assistance. Budget cuts ended this program in the 1980s and U&M programs have struggled ever since. The current fire-driven recognition of a forest health crisis has led to the promotion of another new initiative to improve utilization of small-diameter ladder-fuel species in primarily western forests. Although not yet funded, such efforts typically extend to programs in all 50 states.

Another common function of the state U&M staff is to conduct resource analyses from published data to help identify hypothetically available underutilized timber resources. The development and dissemination of such material may help to get the attention of some companies who are looking to locate processing facilities but since data is publicly available and undoubtedly used by more specialized and experienced private-sector analysts, it is unlikely to be persuasive or essential in industry promotion efforts. These analyses can, however, help align public agencies with the needs of companies looking to site new plants and can help in public discussions of issues surrounding the potential resource impact of a new plant under consideration.

Case Study – Wisconsin Trade Mission to China[217]

In March of 2004, four Wisconsin forest product manufacturers and a Wisconsin Forest Products Marketing & Utilization Specialist spent three weeks in China as part of a Governor's Trade Mission. The focus of the trip was developing contacts in the Chinese furniture and wood manufacturing industry, and developing an understanding of how the Chinese market operates. The four manufacturers who participated in the trade mission included two hardwood lumber mills, a window manufacturer and a door manufacturer.

This trip, coordinated through the Wisconsin Department of Commerce and the state's trade office in China, provided participants an opportunity to get a better understanding of the Chinese marketplace and how forest product manufacturers can access it.

The participants visited four regions of China, including the Guangdong Province (North of Hong Kong), where over half of Chinese furniture exported to the United States is manufactured. For forest product manufacturers, trips to production regions were of value; trips to the capital Beijing were not.

Participants learned that Chinese lumber manufacturers do not have an understanding of U.S. hardwood lumber grades, and this proved problematic to making business deals. Reportedly, the Chinese did not have a consistent standard that U.S. manufacturers could adapt to. Recognizing the need for a common understanding of grades in order to work together, these manufacturers -- in cooperation with the Lakes States Lumber Association – are considering an invitation to have a booth and host grade workshops at a Chinese furniture association meeting in 2005.

Observations from the organizer of this trade mission include:

- Companies who participated in this mission received valuable lessons in the complexities and opportunities of doing business in China;
- During the three week visit, the participants received no requests for certified product;
- By participating in an organized trade mission, companies had access to a wide variety of firms and services that would be difficult to organize on an individual firm level;
- None of the firms who attended bought or sold product during the trip, but all did establish contacts and an understanding of the Chinese marketplace that they found valuable.

In order to organize the trade mission, Wisconsin provided $20,000. Companies paid to participate, and all expenses for a company totaled between $6,000 and $8,000 for travel, lodging, meals, fees to Wisconsin, interpreters, and other expenses.

[217] Personal Communication with Terry Mace, Wisconsin Department of Natural Resources, October 5, 2004.

Emerging Industry Support

An emerging strategy is the implementation of a "cluster-based" approach to economic development. This strategy is being pursued in Wisconsin, coordinated by the state Department of Commerce, and targets and supports industries that create quality, high paying jobs in Wisconsin. Industry clusters, according to a Wisconsin report, are "geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field," such as the paper industry.[218] Although this initiative is still young, it has taken demonstrated steps to identify mechanisms to maintain and enhance the economic health of the paper industry in Wisconsin. Participants in the paper industry economic cluster initiative identified seven general areas of importance: government, public relations, partnerships, infrastructure, research and development, economics, and education.[219] The Wisconsin Paper Council is developing specific recommendations for these seven areas. In addition to these general areas, three priority issues were identified, including reforming the tax structure, streamlining the environmental regulatory system and creating a low-cost, reliable energy system. It is too early to determine the impact of this approach.

One area in which Maine is a leader is in the promotion of forest certification to both assure citizens of the quality of forest management and to satisfy the growing demands of timber product buyers. In fact, it is already well known that some paper purchases have been reallocated from the Lake States to Maine because of certification promotion and higher certified content in the state. For example, in 2002 Time Inc. purchased 90,000 tons (12 percent) of its 600,000 tons of paper from Maine. In 2003, Time sourced 100,000 tons (16 percent) of its paper from Maine. In a presentation to a Natural Resource Industry gathering in Maine, David Refkin, President of TI Paperco, Inc. stated that as a major buyer of paper, his company has a responsibility to incorporate environmentalism and promote continual improvement within its purchasing strategy.[220]

The State of Washington demonstrates some of the most coordinated activities in support of the forest products industry. The state's Department of Natural Resources (DNR) is in a unique position, with a large amount of forestland held in public trust and managed to provide an economic return that supports the state's educational and other institutions. DNR is constitutionally mandated to manage its trust lands not only for short-term returns but also for long-term inter-generational equity. DNR views part of its role as helping to provide a stable source of raw materials within the state.

In addition to this very direct role in industry support, the DNR also works cooperatively with the industry, the University of Washington (UW), and Washington State University

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[218] *Paper industry economic cluster initiative, Part I: The State of Wisconsin's Paper Industry*. February 2003, Prepared by the Wisconsin Paper Council.
[219] *Paper industry economic cluster initiative, Part II: The State of Wisconsin's Paper Industry, Recommendations for Action*. June 2003, Prepared by the Wisconsin Paper Council.
[220] Refkin, David. November 17, 2003. Presentation: TimeInc-towards a greener forest products industry. http://www.maine.gov/governor/baldacci/news/events/refkin_files/TextOnly/index.html (Last accessed: 9/10/2004)

(WSU) to explore existing and potential markets and works to ensure that the resource supply matches market opportunities. For example, DNR, in cooperation with UW and WSU, are in the final stages of a marketing study exploring the connections between primary and secondary markets. In particular, the study is looking at how DNR wood fits into the secondary and value-added marketplace. There are a variety of reasons for the health of the forest products industry but it is evident that Washington appears to provide a good climate for the industry. Several new mills recently opened in the Puget Sound region; DNR believes this can be explained partially by the fact that the industry can depend on a stable resource supply (as well as low energy costs). Finally, DNR is exploring sustainability programs, including the potential for third-party forest certification in the state. The state is exploring both Forest Stewardship Council and Sustainability Forestry Initiative programs.[221] This interest indicates that Maine could be on the leading edge of sustainability issues with its commitment to forest certification, an observation reinforced by a recent action by the Michigan legislature, which is also encouraging certification as a tool to enhance the forest products industry. In 2004, the state legislature passed Public Act 124 establishing a forest development fund, one use of which can be "To obtain and maintain certification of sustainable forestry standards in the state forest…"[222]

Some innovation is occurring in the renewable energy sector, especially in New York State, where Governor Pataki outlined a general goal "to make New York's bio-fuels industry one of the strongest in the nation."[223] Part of this goal expands the core mission of the Center of Excellence in Environmental Systems in Syracuse to include research and development in renewable and clean energy sources. In addition, the Center is encouraged to develop more partnerships with the New York State Research and Development Authority, the SUNY College of Environmental Science and Forestry (ESF), and Cornell University. ESF and the SUNY Center for Sustainable and Renewable Energy in Syracuse act as a clearinghouse for research and development in various types of renewable energy, including biofuels. Researchers at these institutions also are working on the biology and engineering aspects of biofuels.[224]

One example of biomass fuel development in New York is the Laidlaw Energy Group, which was awarded a $1 million state grant to convert a plant from natural gas to wood. This award is apparently a result of Governor Pataki's goal of developing a renewable portfolio standard of 25 percent on in-state power generation. Laidlaw is working with Cousineau Forest Products to bring wood pallets to the power site, where they will be processed into clean wood fuel.[225]

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[221] All information on WA based on personal communication with John Tweedale, Natural Resources Assistant Division Manager, WA State, Dept. of Natural Resources.
[222] NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 324.50507 (4) (c), Public Act 124, May 28, 2004. Popular Name: Act 451.
[223] Governor George Pataki, State of the State, January 7, 2004.
[224] Murphy, Cornelius B. Jr. New York can be a leader into sustainable future. *The Post-Standard (Syracuse)*, 5/23/2004.
[225] Cropp, Ian. Laidlaw power plant to burn wood instead of natural gas/Ellicottville facility received $1 million state grant. *Buffalo News (New York)*, 8/4/2004.

Another biomass project, outside of New York, involved the Central Minnesota Ethanol Cooperative in Little Falls, Minnesota. In this case, a federal grant of $2 million is helping the facility convert from natural gas to wood chips as a source of fuel. Minnesota Project Innovation (MPI), a service helping Minnesota companies compete for research grants from federal agencies, assisted the company in winning the $2 million grant from the U.S. Department of Energy and Department of Agriculture. MPI has since become a fee-for-service operation due to state budget cuts.[226] As of September 2004, the project is not on line. In addition to the grant, USDA-backed loans will be used to finance the project, which is still going through pollution control review. The facility should be operating by the end of the year.[227]

The information technology sector could be an area of innovation for the forest products industry. In particular, use of information technology that goes beyond simple online directories and that connects buyers and sellers is seen as an underutilized growth area by observers.

[226] Homemade energy; as pollution-control equipment became mandatory and the cost of natural gas skyrocketed, an unlikely pair set out to find a solution – cheap energy from biomass. *Star Tribune (Minneapolis, MN)*, 10/17/2003.
[227] Personal communication, Kent Holzer, Operations Manager, Central MN Ethanol Co-op.

Case Study – Web-Based Forest Industries Communities[228]

A number of states are taking steps to develop on-line "communities" that allow interaction between users to promote state forest industries and promote business. These websites are designed to go beyond traditional directories and allow for an ever-increasing amount of information and interaction between users.

In Louisiana, the *Louisiana Forest Products Community* (www.laforestproducts.org) describes itself as an "innovative website that facilitates and promotes sustainable forest-sector economic development in the State of Louisiana." This is accomplished through a searchable database that allows purchasers to identify Louisiana manufacturers that meet their unique purchase needs. It is the intent of the organizers of this website to allow small, rural forest product manufacturers to have the same exposure and market opportunities as large companies.

In Oregon, a new website is under development with an objective "to facilitate connections between 'links in the forest industry value chain' – forest landowners, primary sawmills, secondary manufacturers and service providers." This effort is being undertaken to address a number of identified needs in Oregon's forest products industry, including:

- Lack of information on infrastructure in place for underutilized species;
- Recent changes in the primary processing infrastructure; and
- Lack of information to foster product and market development.

As these websites develop, they will provide an opportunity to learn about how web-based communities can best serve the needs of forest industries.

Outlook

A variety of efforts exist across the country to support and grow the forest industry. These range from traditional economic development strategies that focus on discrete sectors and businesses to new efforts such as cluster-based economic development that build on the synergies that exist with geographic concentrations of interconnected companies. Emerging efforts such as forest certification, renewable energy development, and information technology innovation offer new opportunities, some of which – such as certification – Maine is already exploring and in which it can be characterized as a national leader.

[228] Vlosky, Richard. "State Level Forest Sector Web-Based Communities: Developing a Competitive Edge." *Manufacturing Competitiveness of the Forest Products Industry: Competing in Today's Global Manufacturing and Consumer Marketplace.* New Orleans, LA. November 5, 2004.

BRANDING THE FOREST PRODUCTS OF MAINE
ASSESSMENT AND RECOMMENDATIONS

BY

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Branding the Forest Products of Maine
Assessment and Recommendations

By Robert Bush
Blacksburg, Virginia

Introduction

The following paper provides the opinions of Robert Bush regarding the status and potential for branding solid wood products produced in Maine. The paper is provided by Dr. Bush in his capacity as a private consultant working for Innovative Natural Resource Solutions, LLC of Portland, Maine. The basis for the opinions provided in this paper is a review of publicly available information regarding current and proposed solid wood promotion programs and discussions with people involved in these programs.

Branding

Branding is an omnipresent component of promotion strategies for products in the United States. For the final consumer, brand names and brand marks serve as clues by which they evaluate a product. Also, brands connect the physical products to attitudes and preferences, which may be influenced by other promotional efforts. For industrial products, branding is, in large part, a risk reduction strategy. Purchasing branded products reduces the risk incurred by the purchasing agent. This risk includes unsatisfactory product quality but extends to delivery and other considerations. In these markets, product quality consistency may be as important as the absolute quality level.

Branding a product, that is including a brand mark and/or brand name on a product or it's packaging, has some benefit without a supporting promotion program. Consumers may prefer, and even pay a small premium, for a branded product versus a generic product, even if the brand is completely unknown to them. However, the most successful brands are those that are combined with a promotional program that helps develop a brand image with the target market. Once an image is developed, the brand serves to remind buyers of what the brand represents.

Branding occurs at several levels within the channel of distribution and is applied from the very specific to the broad. Manufacturers may brand their products, distributors may brand, and retailers may use their own brand. Brands may be used for individual products, product families or lines, to the entire output of a manufacturer. Co-branding, the use of more than one brand name or mark on a product, is a common strategy.

Regardless of the level and extent of use of a particular brand, it is clear that a successful brand is a valuable asset. For some companies, an established brand is the most valuable asset. This value arises from brand equity and is expressed in customer willingness to accept price premiums, repeat purchases, new product acceptance, and brand loyalty. In the United States, brands remain important in many product categories. Overall, however, brand loyalty has decreased with increases in product quality. For example,

even automobile buyers who are completely satisfied with their purchase switch brands on a subsequent purchase because of a desire for variety and the high level of quality exhibited by all brands.

Branding of Solid Wood Products

Both consumer and industrial wood products are branded, with varying levels of investment and success. Discussions of the branding programs must recognize the varied nature of solid wood products. This category includes consumer products such as wood household furniture and craft items as well as commodity-like products such as lumber and shipping pallets. Clearly, promotional strategies can and must be varied to match these differing product/markets.

Solid wood consumer products are commonly branded at a variety of levels. For example, manufacturers commonly brand furniture. Also, solid wood furniture is generically branded through trade association promotion programs. Hardwood lumber, a more commodity-like product, may be sold with little branding effort beyond the name of the manufacturer or distributor. Brand marks vary from a distinctive color of end coating paint to brand mark stenciled on a lumber pack. Softwood lumber and panel products typically carry the manufacturer's name as well as a trade or grading agency brand mark. This is a form of co-branding and assures customers of a minimum level of quality and suitability for particular applications.

Relatively few studies have investigated branding of more commodity-like solid wood products such as lumber and panels. Generally, the results indicate limited brand effectiveness as measured by brand recall and preference. This may be the result of limited promotional support to develop and maintain a brand image and/or the product standardization resulting from product grading systems. Companies that have experienced some success with branding have generally done so with a brand image that emphasizes the attributes of the firm rather than the product. Certainly, the product is important and must meet prevailing quality expectations. However, purchasers of such products concentrate on risk reduction by selection a firm with whom they have experience or one with a positive industry-wide reputation. Brand image is often based on the firm's history and experience in the industry, its ability to deliver a range of products (e.g., species, thicknesses) in appropriate quantities and short lead times, and customer support. New wood products initially may be promoted and differentiated based on product characteristics (e.g., wood I-joists). Brands support this product-based differentiation in the early stages of the products life. However, as the product matures and product standards are accepted (again wood I-joists are an example) promotion and differentiation moves toward value and risk reduction.

Certification as Branding

From the customer perspective, environmental certification is similar to other product quality characteristics. For industrial customers this means that the product is suitable for use in particular applications – those where the environmental aspects of the product are

important. For consumers, environmental certification is valued if it corresponds to their particular formulation of quality. Environmental certification is similar to grading systems used for many solid wood products (e.g., lumber, panels). Both environmental certification and conformance to grading criteria are conveyed to customers via brand marks (i.e., stamps), both ensure customers of characteristics that are difficult or impossible to evaluate at the time of purchase, both are administered by third parties, and both are used in co-branding strategies.

Environmental certification has several advantages. When serving knowledgeable and motivated consumers (either directly with consumer products or indirectly with raw materials to make such products), *certification increases the inferred quality of the product*. Changes in inferred value will depend on the price of the product relative to comparable uncertified products. However, the potential for increased value perceptions exists. Even when serving less knowledgeable customers and those who do not value the environmental aspects of certification, certification stamps or brand marks add value as customers use such marks as indicators of overall quality. A recent study conducted at Virginia Tech found that home center customers preferred surfaced hardwood boards that were marked as "environmentally certified" even if they did not value or had no knowledge of what the certification represented. In specific and somewhat limited cases, certification has the advantage of access to markets that are closed to non-certified products.

Of course, environmental certification is not without its limitations. Probably the most commonly mentioned limitation is the apparent limited ability to generate price premiums – premiums that may be necessary to pay for certification activities while maintaining profit levels. It is likely that no definitive answer to this question will be found as consumer responses are situation specific. However, it should be noted that significant price premiums realized by the raw material producer (e.g., timberland owners, lumber manufacturers) are less likely than premiums at the retail and/or distributor level due to the nature of product pricing. Even if premiums are realized in the short run, the structure of many solid wood industries suggests that they will be competed away in the long term.

More significant than price premiums is the question of commoditization. In this regard, environmental certification is similar to grading systems and grade stamps. Both facilitate trade and product consistency. However, both can drive products toward commoditization rather than differentiation. In other words, as more products are certified, the competitive advantage afforded those offering certified products will decline.

For these reasons, environmental certification should be viewed as a product attribute that has value to certain market segments. It should not be viewed as a long-term strategy or as sufficient to develop long-term product differentiation. In particular, certification is not a substitute for branding and other product promotion efforts.

The Maine Forest Certification Initiative

As part of the research for this paper, I reviewed the *Draft Report of the Maine Forest Certification Advisory Committee* as provided by Innovative Natural Resources Solutions LLC. In doing so, I recognized that the charge to this committee was to investigate ways to implement the Maine Forest Certification Initiative rather than to investigate marketing of Maine wood products more broadly. Nonetheless, the issues discussed in the draft report can impact the marketing of Maine products.

As mentioned in a previous section, environmental certification is a product attribute that is valued in some market segments. It is likely that the size and number of segments that value this attribute will increase (despite not growing as was initially predicted). Also, it is likely that the ability of certification to differentiate products will decrease with time. However, when coupled with an appropriate branding and promotion program, certification, and/or the leadership of the State of Maine in certification efforts, could lead to longer-term competitive advantage. For example, the fact that "Maine has the highest percentage of certified forestland in the nation" could be a significant component of a statewide promotion and branding program.

Assuming for the moment that the appropriate State agencies undertake a program to develop a brand image for Maine wood products, a program that includes environmental certification, care must be taken to ensure the integrity of this claim. Specifically, environmental claims must be real and defensible. False or indefensible claims will ruin the brand image and brand equity will be diminished. At the same time, it is recognized that the certification debate has not produced one, clear industry leader.

The *Maine Made* Program

I reviewed available information regarding the Maine Made program administered by the Department of Economic and Community Development and its application to solid wood products. The program and brand builds on the image of the State of Maine and focused primarily, but not exclusively, on consumers and consumer products. Major brand image points are tradition, craftsmanship, and heritage. The brand name is appealing and easy to remember while the brand mark is attractive and emphasizes the nautical history for which Maine is known. The text, "America's Best" is slightly at odds with the overall message of the brand as this claim is not well supported in subsequent promotional materials.

The Maine Made Program is appropriate for some solid wood producers, primarily smaller firms producing furniture and craft items for retail markets and log structure manufacturers. It is likely to be most effective in the Northeastern United States and in major metropolitan areas throughout the U.S. The brand identity and value is less likely to transfer to broad overseas markets or to Canada – a country with a similar heritage. Also, the brand would not transfer well to industrial goods. Overall, the program, as currently implemented, serves a limited segment of the solid wood products industries.

Recommendations

Clearly, a state sponsored branding program for solid wood products produced in the State of Maine could be undertaken in a variety of ways. Important decisions include the scope of products covered by the program (including but not limited to the consumer / industrial product dichotomy), brand identity (i.e., what information is conveyed to the customer through the brand), and the level of promotional support used to develop and maintain brand identity. Also, a decision will be required concerning the fit of a new brand with existing programs (e.g., Maine Made).

Specific recommendations:

1. Maintain the existing Maine Made program; maintain and possibly sharpen its focus on consumer goods;
2. Focus a new program on the segments of the solid wood industry that produce industrial goods;
3. Consider a regional branding/promotion strategy, rather than a state specific program
4. Use environmental certification as a part of the brand image to be developed but do not align the program with a specific certification approach or program
5. Brand development and image building should be facilitated with a promotion program that includes sales promotion (e.g., trade shows) publicity and advertising

Comments:

Recommendations 1 & 2

It is recommended that the existing Maine Made program be maintained and that this program be used as the principal method of promoting solid wood consumer products within North America. This will allow a new program to focus primarily on industrial products – simplifying the branding problem while avoiding duplication.

The two programs would be coordinated to provide coverage of the range of Maine's solid wood products and should be coordinated where possible in terms of look and message. In particular, the Maine Made program should increase its emphasis on Maine's leadership in the areas of forest stewardship and sustainable forestry. The resulting brand image would emphasis tradition, quality, and stewardship/sustainability. The stewardship aspect of the brand image would enhance the perception of wood products and several other product types now included in the program.

Recommendation 3

A regional approach to promotion and generic branding has several advantages. After all, state borders are highly permeable in terms of trade and cross hauling of products is very common. Also, there are obvious economies of scale to be realized through a regional approach and regional groups are likely to be more successful than state specific groups in obtaining federal funds for product promotion and market development.

At least two examples of regional programs exist in the Central and Eastern United States – the Hardwood Manufacturers Association, Inc. and the Southern Forest Products Association / Southern Pine Council. The HMA represents manufacturers of primary and secondary hardwood products in the Appalachian forest region (a region that includes portions of eight states). HMA promotes the "Appalachian" brand based on origin (both "Appalachian" and "made in America"), product quality, economics (e.g., lumber part yield), and resource sustainability. While the promotion is, by necessity, somewhat generic, it corresponds well to the way in which hardwood lumber is marketed. The apparent goals of HMA's promotion program are to differentiate Appalachian lumber from lumber sourced from other regions, develop a preference for Appalachian lumber, and put potential buyers in contact with suppliers/member.

The Southern Forest Products Association represents southern pine product producers (both primary and secondary) in eleven states. The SFPA has a stated mission to "…maintain current markets, develop and expand new market opportunities for Southern Pine forest products, and to engage in such activities and programs that the members deem useful to advance and protect their interests." Through the Southern Pine council the SFPA promotes southern pine as "Strong, Beautiful, Renewable." The promotion program seeks to facilitate product trial, develop positive product perceptions and preference, and facilitate purchases. In addition to promotion, the SFPA provides technical data to facilitate use and influence building codes.

Clearly, there is an opportunity for an analogous program incorporating Maine and additional northeastern states. By focusing such a program on industrial and business-to-business sales, duplication and conflict with existing programs such as the *Maine Made* and *Vermont Quality Wood Product* could be minimized. Economies of scale could be realized, duplicative efforts minimized and such a program would have greater impact in overseas markets.

Recommendation 4

Regardless of the approach taken regarding the scope (i.e., state specific or regional) of the branding and promotion program, decisions regarding the nature of the brand image will need to be made. In other words, decisions regarding the message promotion and branding will convey to customer groups will be required. The state of Maine has several characteristics that could be used to form the basis of this image:

- History and tradition of forestry and forest products
- Among the leaders in sustainable forest utilization and forest certification
- High percentage of products from private lands
- Stocks of preferred species such as northern hardwoods and white pine
- Established and varied industry base

History and tradition can be influential, even in industrial markets, as they relate to transaction risk. This is especially true in the hardwood lumber industry where companies are typically small and business is dependent on personal relationships.

The leadership of the state in the areas of forest stewardship, sustainable forestry, and environmental certification should be emphasized as part of the brand image being developed. The recommendations of the *Maine Forest Certification Advisory Committee* will support and increase this characteristic of the image. However, as mentioned, the branding program should not be aligned with a specific certification program or organization. Such alignment could be limiting, divisive and risky. Rather, the brand should be positioned to highlight the principles of sustainability and local economic development as well as accomplishments in these areas. Suppliers who have certification from specific programs could use the programs brand in a co-branding strategy. Those suppliers that do not have third-party certification would still benefit from the broader brand image.

The last two potential elements of a "Maine" brand build on the unique characteristics of the state (region). Promotional activities would emphasize quality northern hardwoods and white pine as well as providing information about their use (the latter being most important in overseas market development). The variety of production capabilities in the region, and the resulting "one-stop-shopping" should be emphasized.

Finally, it is recommended that branding and promotion does not emphasize the "Best." Both final consumers and industrial buyers are skeptical of such claims as they are so common and, often, not substantiated. In fact, it may not be possible to substantiate such a claim. The preferred approach is to emphasize important product and supplier characteristics, letting customers form an opinion regarding "best."

MAINE'S FOREST RESOURCES

BY

MAINE FOREST SERVICE
DEPARTMENT OF CONSERVATION

Maine Forest Resources

Overview –Maine's forest resources are at a critical juncture where past and current activities might continue in a business as usual venture or perhaps undergo a redirection to more fully realize the potential of resource productivity, manufacturing capability, and lead to an enhanced forest economy.

Maine has a rich history of collecting, analyzing, and forecasting forest resource issues, in addition to the periodic inventory status. These historic assessments range from some very specific species and impact issues to more generalized and broad-based outlooks. A recounting of these includes the following:

- The earliest timber supply outlook was a 3-page assessment contained in the 1972 published report ***The Timber Resources of Maine***, which provided alternative scenarios and projections of growth and removals to the year 2000.
- The first focused analysis was an attempt in the early 1980's to project the specific impacts of the ongoing Spruce Budworm epidemic and alternative management practices (James W. Sewall Company. 1983. Spruce-fir wood supply/demand analysis. Prepared for the Maine Dept. of Conversation, Augusta, Maine).
- The Mid-cycle Resurvey of 1986 was a follow-up review and status of the spruce-fir resource and it provided a confirmation to the 1983 report (Seymour, R.S., and R. C. Lemin. 1998. Timber Supply Projections for Maine, 1980 – 2080).
- In 1993, the Maine Forest Service published ***Assessment of Maine's Wood Supply***, an interim analysis of both the present (1990) and future supply of forest resources. It was intended to fill an information gap because the next USDA Forest Service Periodic Inventory wasn't scheduled for publication until 1995 at the earliest.
- The ***Timber Supply Outlook for Maine: 1995 – 2045***, published by the Maine Forest Service in September, 1998 was the most intensive and detailed technical assessment of future wood supply, using computer modeled simulations to project growth, harvest, and silvicultural practices.
- The most current modeling project was commissioned by the North East State Foresters Association in 1999, and resulted in the 2002 publication of ***A Forest Model for New York, Vermont, New Hampshire, and Maine***. This analysis included four different modeling scenarios and an expanded ecological insight on the interactions across the entire region and individual state-level assessments.
- The most current published data and analysis on statewide forest resources is contained in the October 2003 release of ***Fourth Annual Inventory Report on Maine's Forest***. Where appropriate, analysis representing the **DRAFT *FORESTS OF MAINE, 2003*** report is incorporated for a better understanding of long-term trends.

Neither the separate nor the combined outcomes of all of these modeling and projection efforts have materialized. That is not to imply that the work was done in vain. Rather as a result of efforts, forest managers began or implemented new management behavior to counteract the sometimes-dire projections.

a) **Status of major forest resource components**

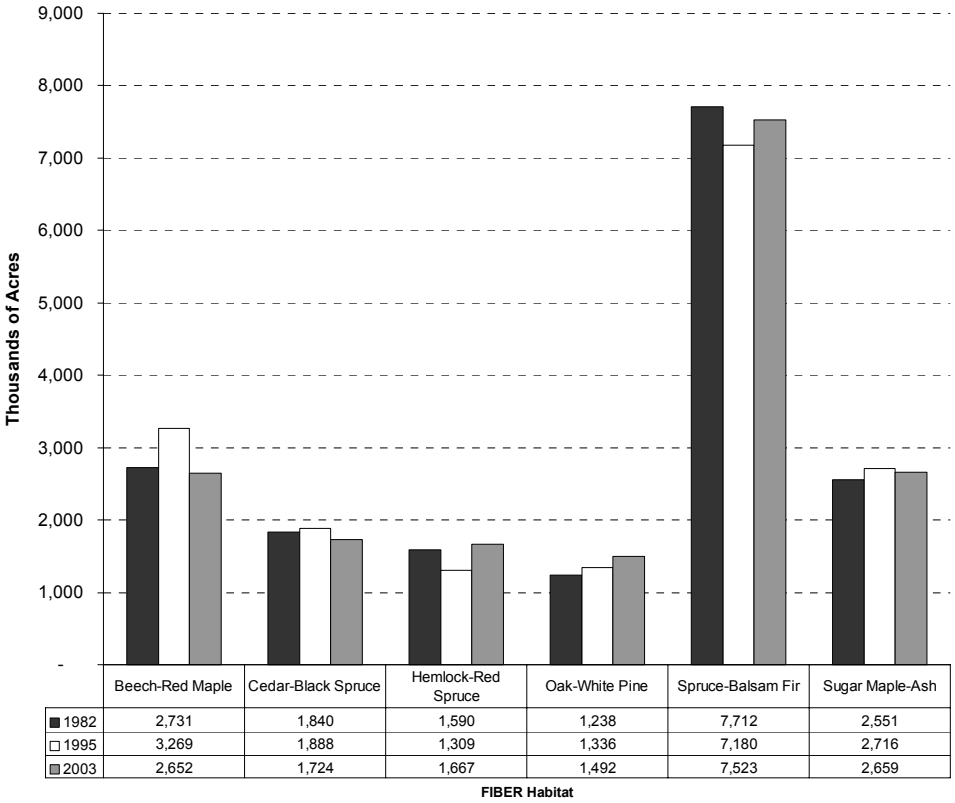
1. Acreage Distribution

(1) Timberland – Over the last 30 years, Maine's forestland base has remained relatively stable and leads the nation, representing 90 percent of all land-based acres. Of all forested lands, 97 percent are classified as being timberland, acreage that is productive, accessible, with harvesting not prohibited. The distribution of these timberland acres are in flux, with conversion losses to nonforested land uses and cover occurring in southern Maine, being more than offset by reversion of agricultural lands to forests in northern Maine.

(2) Ownership – has seen a major shift of approximately 3.5 Million acres in just the last seven years transitioning from the traditional forest industry class to the broad category of non-industrial private landowners. The bulk of this transition has been to a new emerging "Investor" owner class.

(3) Forest Type – there are three major groupings, the northern hardwoods, which are comprised of Sugar Maple/Beech/Yellow Birch, constitute 41 percent of the timberland acreage, while a 30 percent share is classified as Spruce/Fir, and Aspen/White Birch comes in with a 14 percent representation. These types are based on computer-derived algorithms that categorize a type based on stocking (stand density), stand size, and species composition of primarily merchantable sized trees. Because Maine has had a very extensive and intensive harvest experience over the last thirty years, many of these type assignments will prove to be very ephemeral when the plots are revisited over the next 5 to 10 years.

Figure 139. Forest Types for Maine Forestland - 1982, 1995, 2003

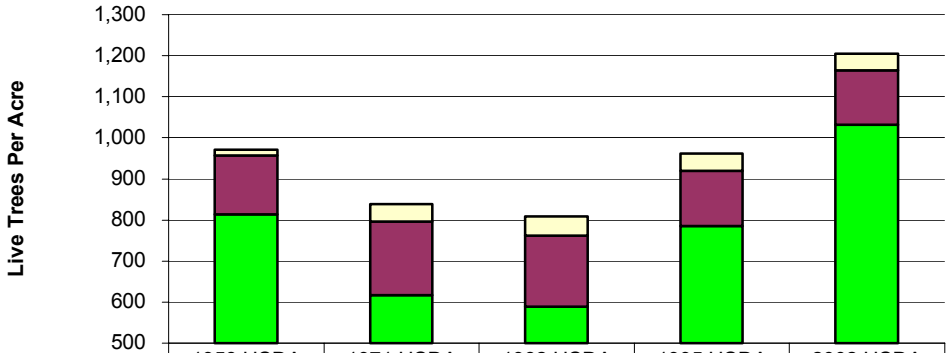


	Beech-Red Maple	Cedar-Black Spruce	Hemlock-Red Spruce	Oak-White Pine	Spruce-Balsam Fir	Sugar Maple-Ash
1982	2,731	1,840	1,590	1,238	7,712	2,551
1995	3,269	1,888	1,309	1,336	7,180	2,716
2003	2,652	1,724	1,667	1,492	7,523	2,659

(4) Stand Size – Historically, the current distribution achieves a very desirable balance with 29 percent of the acreage in sawtimber-sized stands, 42 percent in poletimber, and 24 percent in sapling stands.

2. Tree Distribution – the below Figure 3, from the 4th Annual Report, provides the best depiction and representation of changes in the distribution of tree sizes over the last 40 years. The current high representation of saplings in 2002 is also reflected in the previous discussion on stand size.

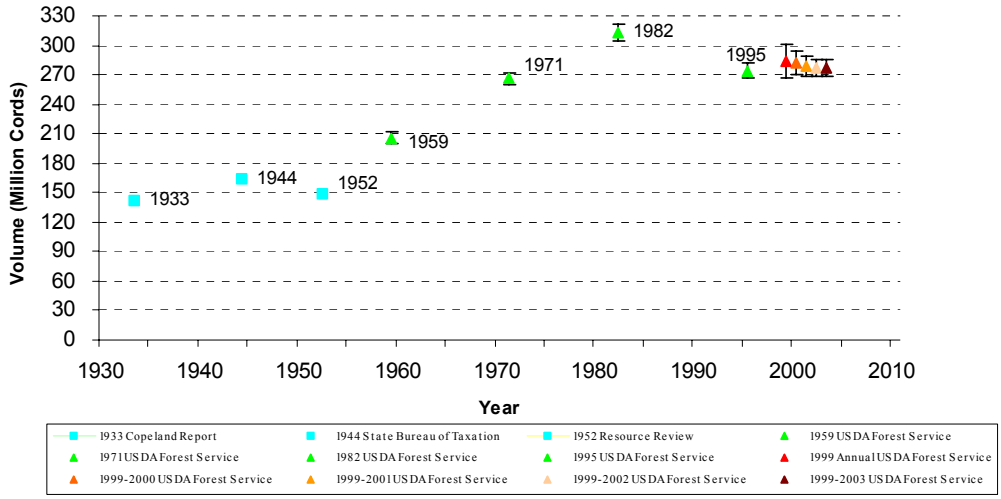
Figure 140. Major Size Class Distribution of Live Trees per Timberland Acre (Average Live Trees/Acre by DBH Grouping displayed)



	1958 USDA Forest Service	1971 USDA Forest Service	1982 USDA Forest Service	1995 USDA Forest Service	2002 USDA Forest Service
Sawtimber	15	43	46	42	41
Poletimber	144	179	174	135	132
Saplings	813	617	589	785	1,032

3. Volume Distribution – can be an extensive discussion depending upon the desired species and product of interest. To provide a more natural progression, the discussion will proceed from the encompassing high-level product of biomass down to the more specific level with estimates of sawtimber supply and quality characteristics for specific species.
    (1) Biomass – There has been a renewed and increased interest over the last few years for this product. Interest comes from such disparate arenas as carbon accounting, availability of fuel stocks for energy, and the potential emerging technology of pyrolysis. In 1995, the overall statewide biomass estimate was 900 Million Dry Tons and included both timber and nontimber components. The equivalent 2002 estimate is 990 Million Dry Tons, with most of the overall 10 percent increase occurring in the sapling component. These are the only current estimates of biomass available for Maine's forest resources.
    (2) Pulpwood – is a unique inventory estimate representing the net volume of the Forest Inventory & Analysis (FIA) tree classes of growing stock and rotten cull trees that are 5.0"+ dbh, have a minimum bole length of 4 feet, and to a minimum 4" top. The following figure depicts the best historic estimates of pulpwood quality in Maine.

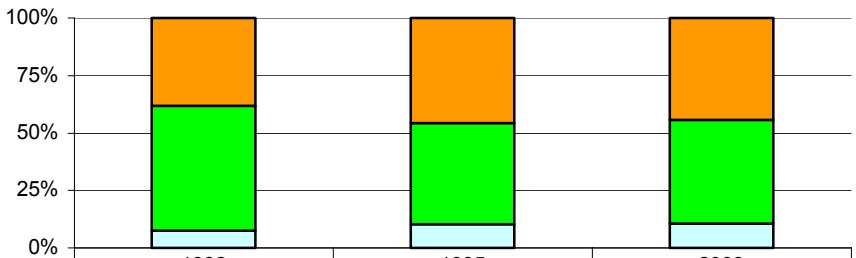
Figure 141. Volume Estimates of Pulpwood Quality[229] or Better Trees and the 95% Confidence Interval



[229] Pulpwood Quality or Better Trees contain the tree classes of "growing stock" and "rough cull".

From a statistical viewpoint, Maine's pulpwood inventory volume has remained stable since 1995 and is approximately 87 percent higher than the similar inventory volume in 1952. With the parsing of pulpwood to three major species groups, the inventory picture is a little more volatile. Pine has steadily increased its share over the last 20 years, while Other Softwoods (predominantly Spruce/Fir) have decreased by approximately 9 percent, and hardwoods have realized an overall 6 percent gain.

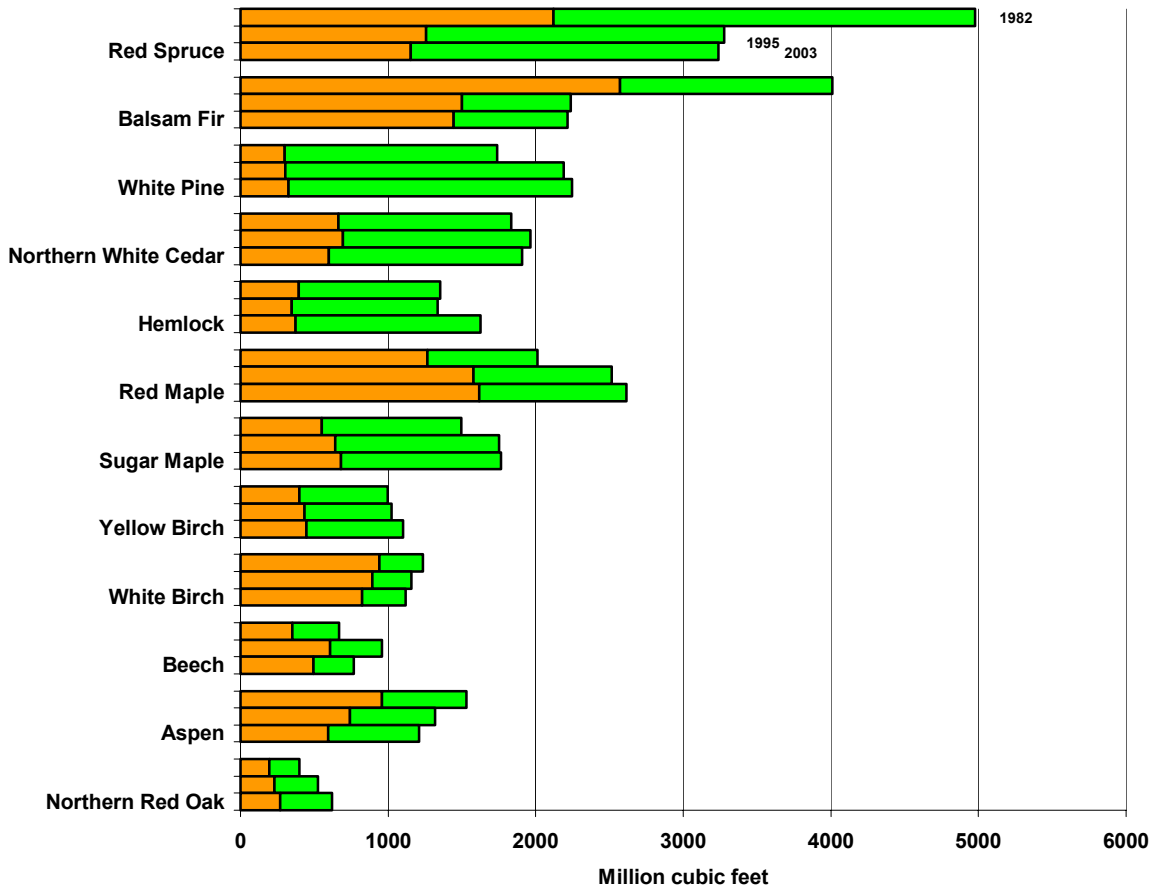
Figure 142. Distribution of Pulpwood Volumes by Major Species Groupings



	1982	1995	2003
Hardwoods	38%	46%	44%
Other Softwoods	54%	44%	45%
Pine	7%	10%	11%

(3) Sawtimber Volume – is based on quality trees that are 9.0”+ dbh for softwood or 11.0”+ dbh for hardwood and contain at least a single 12 ft log segment or 2 – noncontiguous 8 ft. segments in the bole to a respective 6” or 8” top. Since 1995, there have been no significant changes in the volume of any species group. The below series of graphs display the distribution of potential sawtimber volume (Orange), which is below the qualifying dbh and the sawtimber volume (Green) for selected species over the last 3 inventories.

Figure 143. Trends in potential (orange) and current sawtimber (green) inventory for selected species in Maine, for 3 Inventories



With the exception of Balsam Fir, the other four selected softwood species show signs of a maturing resource, steadily increasing their share of sawtimber volume over the 20-year period.

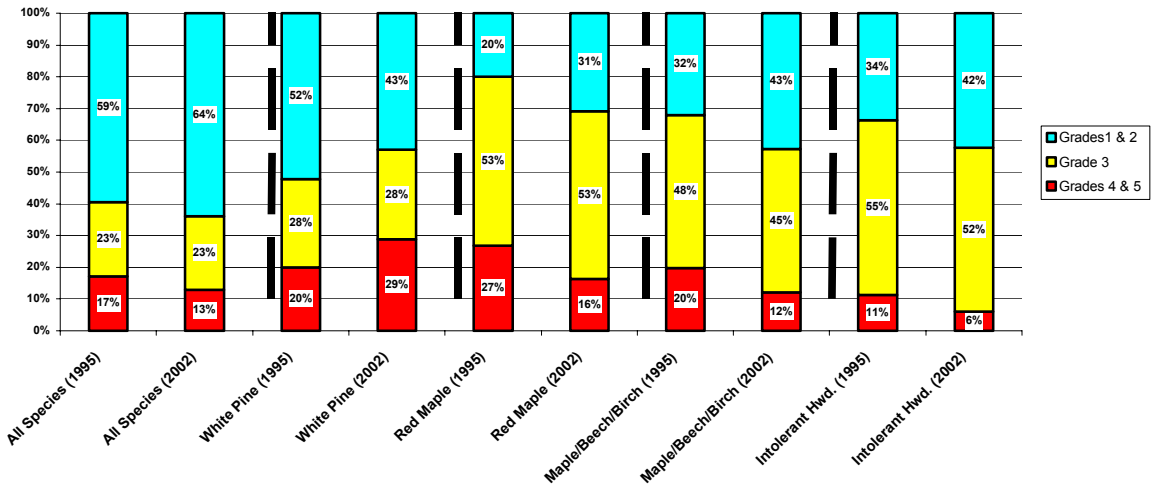
Of the depicted hardwood species, four species are selected for their opposite successional representation, with red maple and white birch being considered as more

pioneer, and sugar maple and yellow birch as more late-successional. The sawtimber volume distribution also reflects that successional spectrum with the pioneer species having the majority of volume contained in potential sawtimber, less than 11.0" dbh, whereas sugar maple and yellow birch have a sawtimber majority. The other noteworthy observation is the consistency in distribution for these four species over the 20-year period.

The final two hardwood species, beech and northern red oak are selected for their divergent response over the last twenty years. Beech has steadily declined in its sawtimber distribution due to the ongoing dual impacts of disease and drought, which brought increased quality degradation and mortality. Northern red oak is the bright spot in the hardwood resource, with a steady increase of 6 percent over the 20-year period.

(4) Sawtimber Quality – is assigned using a tree grading process that evaluates the bottom 16 feet of the tree bole. The grading process and the partition of tree volume to various grades has undergone multiple revisions over the 40-year period of inventory data gathering. The following graph compares the 1995 and 2002 grade assignments, using identical grading procedures, at a variety of levels.

Figure 144. Grade Distribution (%) of All Sawtimber for All Species and for 4 major Species Groups, 1995 and 2002



Grades 1 and 2 are the prime grades representing high quality trees that are 16.0”+ dbh and 13.0”+ dbh respectively. Veneer quality material is not separately graded, but can be considered to be incorporated within the Grade 1 assignment. Grade 3 represents the pallet log market, and grades 4 and 5 are assigned to identify markets of local use and utility.

For all species the share of grades 1 & 2 has increased 5 percent over the last 7 years, another indication of Maine’s maturing resource. The other encouraging development is the 4 percent reduction in grades 4 & 5. White pine is a species of concern due to the 9 percent reduction in grades 1 & 2 and the corresponding increase of 9 percent in Grades 4 & 5. Without further specific analysis, it is unknown whether this grade swap is due to the degradation of large trees (13.0”+ dbh), i.e. 1998 Ice storm, or an influx of smaller sawtimber trees (9,0” – 12.9” dbh) that are of very poor quality.

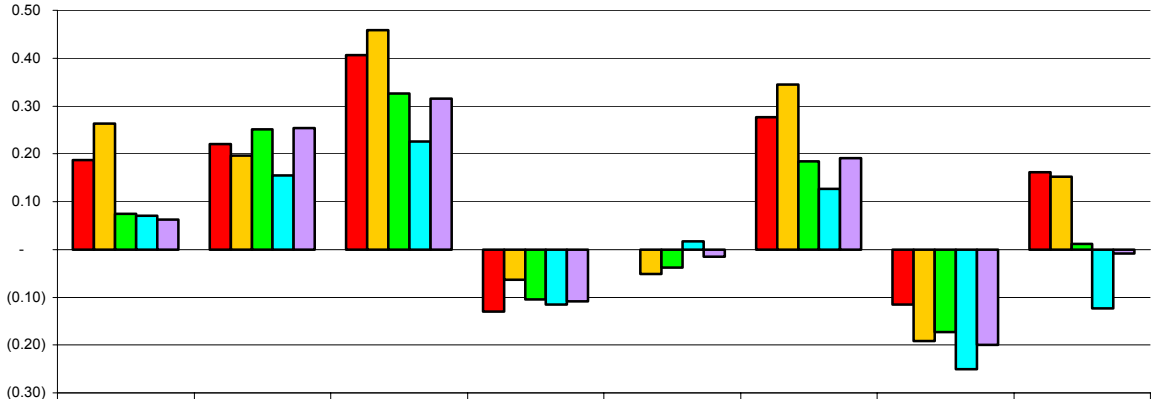
The increase in red maple’s share of the top grades is encouraging and may provide a new marketing opportunity. As discussed earlier, sugar maple and yellow birch are responsible for the 11 percent increase in the prime grades within the Maple/Beech/Birch

grouping. In the Intolerant group, the maturing resource of Aspen is predominantly responsible for the increase in grades 1 & 2, the white birch component rarely gets large enough to qualify for grade 1 (minimum 16.0" dbh).

b) **Long-term potential of forest resources**

1. **Components of Change** – are the forestry version of credit and debit accounting. Ideally net growth is sufficient to offset removals, providing a positive net change remainder that is then available for balancing against near-term and unforeseen catastrophes like insect/disease outbreaks, severe weather events, forest fires, or new manufacturing opportunities. The following four graphs provide a pictorial display of these components as originally published in the respective inventory report.

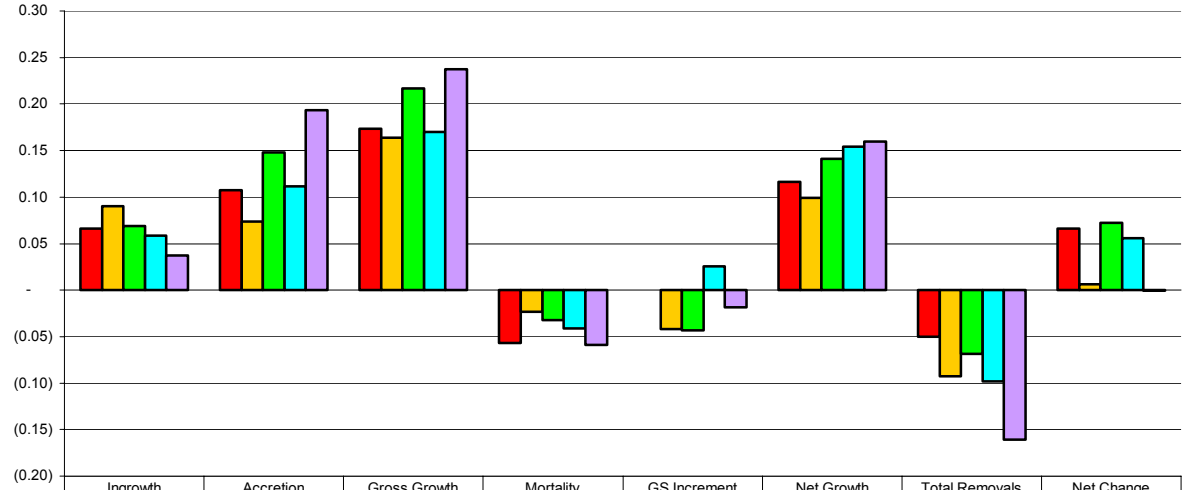
Figure 145. Softwood Components of Change (Cords/Acre/Year) by Inventory Year



	Ingrowth	Accretion	Gross Growth	Mortality	GS Increment	Net Growth	Total Removals	Net Change
1959	0.19	0.22	0.41	(0.13)	-	0.28	(0.12)	0.16
1972	0.26	0.20	0.46	(0.06)	(0.05)	0.34	(0.19)	0.15
1982	0.07	0.25	0.33	(0.10)	(0.04)	0.18	(0.17)	0.01
1995	0.07	0.15	0.23	(0.12)	0.02	0.13	(0.25)	(0.12)
2003	0.06	0.25	0.32	(0.11)	(0.02)	0.19	(0.20)	(0.01)

The net change estimate of -0.01 cords/acre/year for softwood is a welcome improvement from the 1995 estimate. The major historic factor that gives softwood its impetus is ingrowth, which in 1972 helped achieve the highest recorded gross growth estimate of 0.46 cords/acre/year, and then boosted the next inventory to a record 0.25 cords/acre/year accretion estimate. A goal for softwood is to implement forest management practices that either reduce mortality or pre-capture it in a harvest.

Figure 146. Hardwood Components of Change (Cords/Acre/Year) by Inventory Year

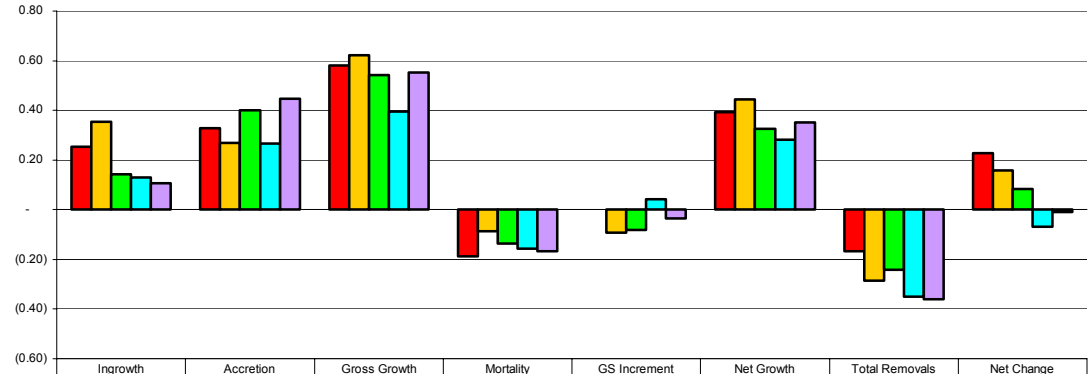


	Ingrowth	Accretion	Gross Growth	Mortality	GS Increment	Net Growth	Total Removals	Net Change
1959	0.07	0.11	0.17	(0.06)	-	0.12	(0.05)	0.07
1972	0.09	0.07	0.16	(0.02)	(0.04)	0.10	(0.09)	0.01
1982	0.07	0.15	0.22	(0.03)	(0.04)	0.14	(0.07)	0.07
1995	0.06	0.11	0.17	(0.04)	0.03	0.15	(0.10)	0.06
2003	0.04	0.19	0.24	(0.06)	(0.02)	0.16	(0.16)	(0.00)

The hardwood components of change have been and still are in relative balance; though the 50% increase in the removal rate since 1995 effectively have this group at a net change of zero in 2003. The forest management opportunity for hardwood is to eliminate the negative growing stock increment value by timely harvest and tree selection.

Combining the two species groups into the single graph below, serves as a surrogate for determining potential and long-term forest resource sustainability. The overall picture, while exhibiting some volatility, suggests that the historic downward trend may be reversing to a point where net change is rebounding to a near-neutral position. This is not the time for complacency in implementing active forest management practices with the intent to improve stand dynamics.

Figure 147. All Species Components of Change (Cords/Acre/Year) by Inventory Year



	Ingrowth	Accretion	Gross Growth	Mortality	GS Increment	Net Growth	Total Removals	Net Change
1959	0.25	0.33	0.58	(0.19)	-	0.39	(0.17)	0.23
1972	0.35	0.27	0.62	(0.09)	(0.09)	0.44	(0.28)	0.16
1982	0.14	0.40	0.54	(0.14)	(0.08)	0.33	(0.24)	0.08
1995	0.13	0.27	0.40	(0.16)	0.04	0.28	(0.35)	(0.07)
2003	0.11	0.45	0.55	(0.17)	(0.03)	0.35	(0.36)	(0.01)

To date, there have been 5 inventories of Maine's forest resources, starting with the initial data collection in 1952 and ending with the most recent annual panel in 2003. If this 40-year plus period is considered to be reflective of both the good and the bad in terms of forest management and resource impacts, what would be the idealized set of components of change that could better represent the potential of Maine's forests? This idealized construct was developed by separately evaluating softwood and hardwood components of change:

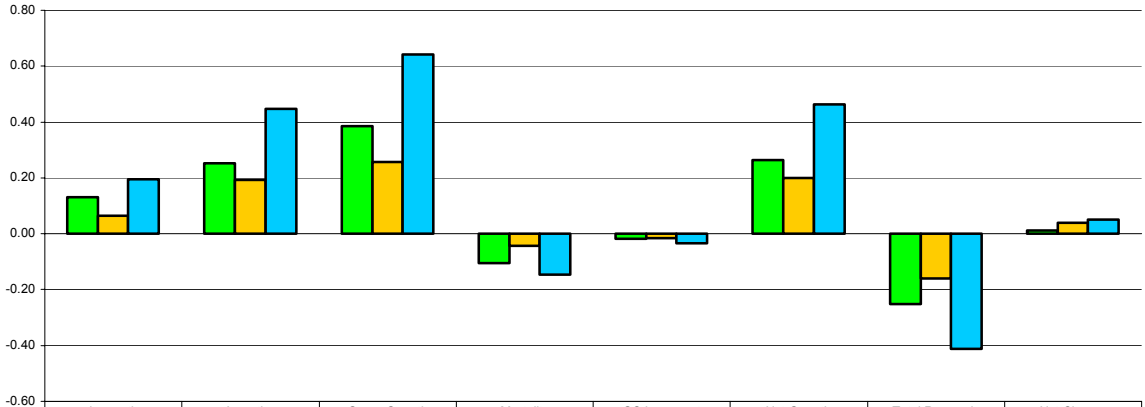
- **Ingrowth** – the management focus is to find a way to alter the traditional one-time periodic pulse and convert it to a steady trickle represented by a better distributed forest age/development structure. To represent that focus the 5 inventory estimates of softwood and hardwood ingrowth were separately averaged for a combined idealized component of change.
- **Accretion** – needs to be maintained at an optimum rate, reflecting management practices that focus the compounding growth increment on quality trees. To represent that focus, the highest softwood (1982) and hardwood (2003) accretion estimate was selected and then summed for this component of change.
- **Mortality** – like ingrowth, there is a need for implementing management practices that eliminate the periodic flush, primarily attributable to spruce budworm

epidemics, and ideally convert this estimate to a steady and minor trickle. To represent that focus the 5 inventory estimates of softwood and hardwood mortality were separately averaged for a combined idealized component of change. This value of –0.15 cords/acre/year can still be dramatically reduced to a more normal background mortality level of around –0.05 cords/acre/year through active management that pre-captures mortality into a useable forest product.

- **Growing stock increment** – this measure is the net effect of changes in tree quality, when it is negative it implies that tree degradation is more dominant. There are opportunities in forest management to improve the harvest selection and minimize harvest impacts to residual trees.
- **Removals** – for this component of change the highest recorded estimate was selected for both softwood (1995) and for hardwood (2003) and then summed in order to best represent and sustain existing manufacturing capabilities and export/import markets.

The results of this mathematical and selection process is depicted in the below graph.

Figure 148. Idealized Components of Change (Cords/Acre/Year)



	Ingrowth	Accretion	Gross Growth	Mortality	GS Increment	Net Growth	Total Removals	Net Change
Softwood	0.13	0.25	0.38	-0.10	-0.02	0.26	-0.25	0.01
Hardwood	0.06	0.19	0.26	-0.04	-0.02	0.20	-0.16	0.04
All Species	0.20	0.45	0.64	-0.15	-0.03	0.46	-0.41	0.05

To put into a more simple context, the chosen removal rates represent a 4.3 Million cord harvest of softwood and a 2.7 Million cord harvest of hardwood products, for a total harvest of 7 Million cords on an annual basis, a total that is currently about 1 Million cords more than the recent 8-year average. Even with this record harvest, there is still an idealized positive net change value remaining. The forest resources of Maine have a long and rich history of harvesting a multitude of products; this idealized concept shows that there is an equal and real need to develop an equally robust, long, and rich history on managing the growth side of the equation. The potential of a long-term overall annual

net growth on the order of 0.46 cords/acre/year is not a crystal-ball guess, pie-in-the-sky, or a dream.

The overarching challenge is to implement forest management practices that improve net growth in order to sustain the desired harvest levels that recent history has recorded. This will need to be done concurrently with the management of new stress situations.

c) **Long-term threats to continued supply**

1. **Invasive Exotic Pests** – Maine's forests currently face an increasing threat from the potential introduction, establishment, and expansion of foreign invasive pest species. Native insects like spruce budworm periodically kill vast numbers of trees in Maine's forests, but the ecosystem is adapted to these perturbations. Although it can take years, the forest and the forest-based economy can recover. Foreign pests, because they are now in a situation without a complement of natural enemies and host resistance, can result in a situation far more devastating and permanent.
    (1) Previously established nonnative pests like beech bark disease, chestnut blight, Dutch elm disease, and gypsy moth have already diminished the character and diversity of Maine's forests. The loss extends beyond just losing commercially valuable trees, also seriously affecting wildlife dependent on these trees for food and shelter.
    (2) Other foreign pests like balsam woolly adelgid and browntail moth, that had been endemic in Maine for years, are resurging: intensifying and expanding their range; with concurrent impact to the forest and forest-dependant communities.
    (3) Hemlock woolly adelgid is now established in southern Maine, and nursery stock from nurseries infected with sudden oak death has been shipped into Maine. Asian longhorned beetle and emerald ash borer, although more removed, are at least as serious.
    (4) The combination of a very mobile society and the rapid movement of goods and services around the world virtually assures that the flow of additional pest species inadvertently brought to North America will continue; and the current fluctuations in climate patterns appear to increase the chances of successful establishment.

2. **Climate Change**

    (1) The current fluctuations in climate patterns are already producing measurable impacts on our forests: White pine decline and beech dieback associated with drought stress. The influences of drought extend well beyond direct effects; increased vulnerability to other stress agents, although difficult to quantify, is very real.
    (2) The recent spate of more moderate winters is increasing survival rates of several existing pest species (i.e. balsam woolly adelgid), allowing increased population intensity and pest range, and resulting in increased host mortality across a broader area of the state than we have seen in the recent past.

Situations like these could become more common and have more significant impact on the forest if climate trends in the future continue to stress the existing forest types while favoring their damage agents.

Recommendations

Actively managed forests will achieve the desired conditions, amenities, and products.

Continue to provide timely analysis and trend assessment:

(1) The current USDA FIA annualized inventory, being implemented with the cooperation of the Maine Forest Service, must be maintained on its current 5-year cycle of panels.

(2) The Maine Forest Service needs continued support and funding for data collection, analysis, and timely reporting.

Providing tools for informed changes in the forest management of Maine's extensive resources:

(3) A new and enhanced timber supply analysis is needed using the complete set of 5-year inventory data. The time is ripe for the Maine Forest Service and other partners to initiate and complete a new and enhanced timber supply analysis. Tools now exist that allow more detailed modeling of species, products, and silvicultural practices and the production of an optimized result, which can also incorporate ecological considerations. This will require staff dedicated to running, developing, and maintaining these complex models.

Glossary of Terms Used in the chapter "Maine's Forest Resources"

Accretion – The estimated net growth on surviving growing stock trees that were measured during the previous inventory (divided by the number of growing seasons between surveys to produce average annual accretion). Accretion does not include the growth on trees that were cut during the period, nor those trees that died. This component of change uses the incremental difference in the tree's basal area between the two inventories.

Gross Growth – The arithmetic sum of the Ingrowth and Accretion components of change.

Growing Stock Decrement – Includes growing stock trees in the previous inventory that are classified as rough or rotten in the current inventory (divided by the number of growing seasons between surveys to produce average annual growing stock decrement). This component of change uses the previous tree's basal area.

Growing Stock Increment – Includes either rough or rotten trees in the previous inventory that are classified as growing stock trees in the current inventory (divided by the number of growing seasons between surveys to produce average annual growing stock increment). This component of change uses the current tree's basal area.

Growing Stock Tree (or Growing Stock) – A classification of timber inventory that includes live trees of commercial species meeting specified standards of quality and vigor. Cull trees (rough and rotten trees) are excluded.

Ingrowth – Includes growing stock trees that became 5.0" diameter at breast height (dbh) or larger during the period between inventories (divided by the number of growing seasons between surveys to produce average annual ingrowth). Also, includes growing stock trees, 5.0" dbh and larger, that are growing on land that was reclassified from noncommercial forestland or nonforest land to timberland. This component of change uses the current tree's basal area.

Mortality – Includes growing stock trees that die from natural causes before the current inventory (divided by the number of growing seasons between surveys to produce average annual mortality). This component of change uses the previous tree's basal area.

Net Change – The difference between the current and previous inventory estimates of growing stock (divided by the number of growing seasons between surveys to produce average annual net change). It is the arithmetic sum of Net Growth minus Removals.

Net Growth – The resultant change from natural causes in growing stock during the period between surveys (divided by the number of growing seasons between the surveys to produce average annual net growth). It is the arithmetic sum of Gross Growth, minus Mortality, plus Growing Stock Increment, minus Growing Stock Decrement components of change.

Total Removals – Represents the arithmetic sum of the Harvest and Land Use Removal components of change.

INTERVIEWS WITH INVESTORS AND FINANCIAL PROFESSIONALS

BY

PAN ATLANTIC CONSULTANTS

Interviews with Investors and Financial Professionals

With funding provided by the Maine Technology Institute, Innovative Natural Resource Solutions LLC hired PanAtlantic Consultants of Portland, Maine to:

> "Conduct one-on-one interviews with financial professionals, venture capitalists, forest industry leaders and other private-sector individuals to determine what actions the state might take to make investment in new technologies for forest industries more attractive."

This action was recommended by a number of industry participants at the November 2003 Blaine House Conference on Maine's Natural Resource Based Industries. Pan Atlantic has extensive working knowledge of Maine's investment and banking community, and was selected because of this expertise.

Pan Atlantic was hired specifically to gauge the attitudes and opinions of individuals who make financial decisions about forest product manufacturing in Maine. It is important to note that what is contained in this report is based upon perception; however, it is these perceptions that impact investment (or lack thereof) in Maine's forest products sector.

REPORT TO

INNOVATIVE NATURAL RESOURCE SOLUTIONS LLC

MAINE FOREST PRODUCTS INDUSTRY INVESTMENT RESEARCH

PREPARED BY
PAN ATLANTIC CONSULTANTS
PORTLAND, MAINE

AUGUST 2004

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I. INTRODUCTION

In June, 2004, Pan Atlantic Consultants of Portland, Maine (PAC) was contracted by Innovative Natural Resource Solutions LLC (INRS), of Antrim, New Hampshire and Portland, Maine, to conduct research on investment trends in Maine's forest products industry. This investment research project is one component of a larger research initiative which will provide a broad overview of the processing sectors within Maine's forest products industry.

The Maine Department of Conservation – Maine Forest Service commissioned the overall study in an effort to build a greater understanding of the forces shaping the industry, and ultimately Maine's overall economy.

PAC conducted interviews of industry experts and representatives during the period between June 15, 2004 and August 31, 2004. Analysis and reporting of results were completed during the same period.

II. PROJECT OBJECTIVES

Objectives for our research and analysis phase were relatively straightforward and focused, in order to be integrated within the framework of the larger study being conducted by INRS, on the future of the Maine forest products sector. They are:

1. Evaluate attitudes toward, and the level of propensity to finance companies in the following sectors (see below).

2. Determine how Maine can best encourage investment in new technology within the forest products industry.

PAC and Innovative Natural Resource Solutions LLC agreed upon the following key issues to be researched and evaluated with financing sources, during the course of the research project:

- Current and past level of company's financing in these sectors
- Historic performance (returns achieved) by financing in these sectors
- Recent trends in financing in these sectors
- Attitudes towards financing in these sectors
- Prioritization and rating of the attractiveness of financing within these sectors
- Level of awareness of potential deals in these sectors
- Perceived results (return levels) of financing in these sectors
- Major perceived deterrents to providing financing in these sectors
- Interest levels in financing future deals in these sectors
- How financing sources typically access information on potential deals
- The perceived utility of setting up an information clearing house on potential deals
- Information that financiers would like to have prior to deciding if they want to review potential deals
- Actions which the following need to take to stimulate investment in these sectors:

    a) The industry
    b) Relevant state agencies – Department of Conservation (DOC), Finance Authority of Maine (FAME), Maine Technology Institute (MTI), Department of Economic and Community Development (DECD), etc.

Research was focused on sectors involved in the production of forest products, or the consumption of wood products as a fuel. These included:

- Saw and planing mills
- Secondary wood products companies, such as furniture, wood components manufacturers, etc.
- Wood composites manufacturers
- Paper mills
- Biomass facilities

The evaluation of current investment attitudes was achieved through a thorough analysis of the past, present and future trends that shape the market and, by extension, the level of optimism or pessimism of investors. The determination of the best ways to encourage investment was achieved by posing direct questions to those in a position to lend or invest, as well as through analysis on the part of PAC.

It is important to note that PAC's key research objective was to measure investment attitudes and perceptions among bankers, investors and industry executives. It was not within the scope of the project to conduct follow-up research into specific incidents or situations relayed by respondents, which may have led to their current attitudes or perceptions. For this reason, comments may not portray all of the subtleties or complexities of each situation, but show the information upon which interviewees base their opinions.

III. Project Methodology

Pan Atlantic Consultants employed a two-part research methodology in order to build an understanding of current investment attitudes and strategies to encourage future investment:

A. **Secondary Research** was conducted to gather and analyze industry and state information that was relevant to the financing topic, and to issues that arose during our primary research surveys.

B. **Primary Research** comprised the most important and in-depth portion of our work. This research consisted of 37 in-depth, qualitative market interviews among:

- Maine banking executives
- Equipment dealers
- Land owners
- Lumber mill owners
- Industry association executives
- Paper company executives

Our primary research interviews were conducted both in-person and by telephone. In most cases, our discussions had durations of between 1-2 hours. Our survey instrument (included in Appendix H) probed past, current and future trends that define the market outlook, as well as investment source and industry recommendations, for the best ways to improve market conditions and the flow of capital to forest products sector.

All survey respondents were very engaged in the subject and fully aware of our survey goals. In exchange for their candid statements, some survey respondents requested that their ideas and recommendations be reported anonymously. For this reason, we have only identified quotes by the industry or sector of the respondent.

When all surveys were completed, Pan Atlantic Consultants analyzed findings, consolidated recommendations from respondents and provided further recommendations of its own.

IV. INVESTMENT OVERVIEW

A strong future for the Maine forest products sector depends in large part on the willingness to invest in the industry. A willingness to invest, how to measure it, and how to encourage it, is in large part, akin to measuring and spurring consumer confidence – no single solution will suffice. Instead, strong levels of investment and a robust market will be driven by:

- An in-depth understanding of the complex set of global issues that drive the market

- Active management of the various market inputs which affect its overall direction.

Our investment survey provides a global view of these complex issues, which directly impact attitudes, optimism, and the propensity to invest among bankers, investors and company owners.

Ultimately, we found that there is a dichotomy of perspectives in the financial outlook for the forest products industry:

- **Lending:** Bankers in the state of Maine report no shortage of funding for well-managed forest products businesses. In fact, loans to the forest products industry are a very competitive business and bankers would like to see more deals in the future. Of course, borrowers must be well qualified, with strong collateral, just as in any other industry.

- **Investment/Borrowing:** The less-optimistic perspectives on the industry tend to come from the side of company owners and managers, who are often unsure if investments in their businesses will be secure over the long term.

Although we interviewed a diverse set of industry experts and representatives we were surprised at the cohesiveness of their views on the industry, and the most appropriate ways to strengthen it. In the following pages, we will explain how the most important drivers of investor confidence can be summarized in four key areas:

1. Legislative stability

2. Regulatory stability

3. Tax incentives

4. Infrastructure support

These are, of course, not insignificant issues for the state to consider, but they are critical to Maine's image among investors both inside and outside of the state. They also represent the key ways in which Maine can help to ensure some level of competitiveness for its businesses (and its overall economy), against foreign competitors.

V. CURRENT MARKET SITUATION

The Maine forest products industry can be characterized as a mature market, representing a wide range of commodity products, with a smaller number of non-commodity products. As such, the challenges faced by this industry are not unique among industries that have undergone the effects of maturation, hyper competition and commoditization of product.

> *"Most commodity-based businesses have wide swings in prices. In commodity markets, you only need a 2-3% swing either way to make a significant impact." Maine Banker*

In order to deal with market threats and opportunities most effectively, it is imperative that Maine businesses and Maine state government fully appreciate that they operate in a global marketplace, regardless of the local markets that they serve. Many of the market leaders that we interviewed pointed to the casualties of the market who did not understand the full impact that global competition would have on their operations.

> *"A lot of the companies that went out of business were family owned, where management got tired and didn't know how to find new markets. The ones that will survive will have very little debt and astute management." Maine Banker*

> *"The forest products playing field is truly an international one, so we have to do things in the same way that other countries do. It's the purest form of capitalism – survival of the fittest – It's a great theory, but not everybody is competing that way." Maine Banker*

> *"The Northeast region is part of a regional market. Canadians look at it that way, but I'm not sure that Maine looks at it this way. That's why you see more Canadians investing in Maine than the other way around." Maine Sawmill*

Despite the intense challenges that are faced by the market today, **many were quick to point out that contrary to popular belief, Maine's industry is not dying.** It's true that a tremendous amount of change has occurred, and that the extent of the challenges varies by sector, but the industry itself has good potential for future success.

> *"People say this is a dying industry. It's not the truth. We have a great story to tell about environmental balance and the strength of our communities. We have to focus on how to make Maine a better place to do business." Patrick Strauch, Maine Forest Products Council*

> *"There's a big perception that we are a dying industry, because the environmental groups have promoted that. If you look at Lloyd Irland's report Evergreen Industry, it says that Maine is producing 50% more softwood lumber and 200% more hardwood lumber, and there is more wood on the stump than in 1989." Sawmill Owner*

"This is not a dying industry, or one with no future. Our production and employment [at our mill] are growing." Sawmill Owner

The Maine forest products industry is currently in a stage of transition where many of the weaker, less flexible companies have been weeded out by market forces. Those who remain are in many cases, top-class businesses.

"The truth is that if you are in business in Maine, you must be doing something right. We have a better quality business person here because of the challenges you have to deal with." Maine Banker

Even for these companies, market fluctuations and global competitive pressures will always require strong support from state government to help them to remain competitive. Additionally, a strong future for Maine's forest products economy will require new entrepreneurs to be attracted to build the next phase of the industry.

"We're not seeing many new entrepreneurs in the industry. I'm truly concerned about the long term viability of the industry." Maine Banker

There are a number of key actions that must be taken by both industry and government in order to follow a path of continued success and strengthen investor confidence. These include re-investment in equipment, a close working relationship between industry and government, and strong incentives to attract investment in the industry.

We learned in the course of our research that business owners and bankers do not expect government to "solve" the problem for them. Instead, they want the government to create a stable and responsive environment in which businesses can succeed, and feel comfortable about investing.

"We should not look to the state government for [industry] change. We should be looking for a response to what we ask." Maine Banker

VI. MARKET TRENDS

The most dramatic trend to impact Maine's forest products industry has been the globalization of wood products markets. All sectors within the industry have felt the effects of globalization, from the foreign supply of wood flooding US markets, to the manufacture of hardwood products in China which are shipped to the US and sold less expensively than Maine's producers can make them.

This intense competition has lowered prices and the perceived value of product, setting in motion a complex set of market forces that have had a ripple effect through all parts of the supply chain. Products from wood pulp, to turned hardwood, to furniture have become commoditized and purchased on a low-price basis.

> *"Wood turning mills, primarily hardwood mills, have been devastated due to Chinese imports. They can import the wood, do the manufacturing, pay a middleman and still sell it for 20%-30% less. And fewer things are made out of wood now. Plastic is used for screwdriver handles, etc." Maine Banker*

> *"You cannot buy domestic dowels anymore. There is a price difference of $90 per thousand for the US product and $25 per thousand for the Chinese product."*

The globalization of markets also brings the secondary effects of global currency fluctuations. The economic downturn of the past four years has had a dramatic impact on the valuation of currencies both in the US and abroad. In fact, slim margins from commodity products have created a situation where many companies, both foreign and domestic, make their profits directly from currency fluctuations.

During the period when the US dollar was strong, Maine companies suffered, as imports to the US increased. The market was flooded with low-priced raw materials and finished product from foreign markets.

> *"Everybody talks about wanting a strong dollar, but that is what has really hurt this industry in the past few years. It wasn't until the dollar weakened that things started to turn around." Maine Banker*

As in earlier downturns, many suppliers cut back production, or let their machinery go idle, waiting for prices to rise.

> *"In the old days, manufacturers would just ride out the hard times and wait till it came back." Maine Banker*

While this may be a strategy that can be followed by small operations, or independent contract loggers with a lower investment, today's larger, vertically-integrated logging operations must run their equipment continuously in order to achieve an adequate return on their investment.

"There are far fewer loggers now, than in the past. Now, they are more vertically integrated. The logging industry has become fairly consolidated over the last 20 years, as the cost of equipment has become higher and a movement has been made towards harvesting systems rather than skidders. A new skidder will cost $30,000, while a new harvester will cost $450,000." Maine Banker

Many suppliers who were not positioned to weather the economic peaks and valleys did not survive.

"Profitability allows companies to weather international events." Maine Banker

Finished product producers such as paper mills also decreased production in response to lower demand during the downturn. All of these measures put the industry at a disadvantage, making them slower to come back online when the dollar weakened and the potential for US suppliers was expanded - mills were caught with low inventories and many suppliers were unable to keep up with demand.

Among loggers that were better positioned, however, the market rebounded at the beginning of the year:

"As of the 1st of January, a lot of things have come together to drive demand:

1. *A lack of production capacity (operators)*

2. *A really wet fall: One of the rising hot-buttons in the industry is "green" certification. Part of that means you can't operate where you create excess muddy conditions that lead to soil erosion. This significantly limited the amount of wood that could be cut last fall.*

3. *Just-in-time inventory practices of mills that have dwindling onsite inventories and now need more product." Maine banker*

"In the past 3 years, we've had a record-breaking housing market, but everybody has been shipping product into the US. About 1 year ago, the dollar began weakening and we are now starting to make more money." Maine sawmill owner

Of course, improvements in the industry do not always affect all sectors equally: Increases in demand have raised wood prices and reportedly squeezed profits for product producers.

Uncertainty in the forces of market supply and demand led to lower overall levels of new investment and re-investment, creating fewer deals for lenders. One of the results of this lack of investment has been the aging of Maine's plants and equipment.

This aging trend could not have come at a worse time: The tight margins of a commodity market require automated processes with fewer labor hours in order to produce product most profitably.

Here, Maine businesses have found themselves to be significantly behind their foreign competitors.

> *"The machine we shut down in Westbrook in October was arguably the highest cost coated free-sheet paper machine in the world. We had a chart of all 87 of these types of machines and this one was number 87." Sarah Manchester, General Counsel, North America, Sappi*

In all sectors, state-of-the-art equipment allows suppliers and manufacturers to produce more efficiently. This trend is dramatically changing the investment landscape in forest products production, from highly automated logging equipment costing hundreds of thousands of dollars, to sawmill equipment with optical scanners costing millions of dollars, to modern paper production machinery costing hundreds of millions of dollars.

Clearly, it takes a strong set of economic benefits and assurances to spur investment in any part of the industry. Globalization, commoditization, economic downturns and currency fluctuations are enough to make any investor become more cautious.

Unfortunately, the state of Maine has had other forces at work further weakening confidence in its business environment. Most significantly two key issues were mentioned in virtually every interview we conducted:

> *"Maine is not a business-friendly state."*
>
> *"There is a lack of stability in the legislative process in Maine."*

Company owners both inside and outside of the state perceive Maine to be non-business friendly as compared to other states. In the case of in-state company owners, or "captive firms", they often do not have a choice but to reinvest in Maine. But, these owners report that their levels of investment would be significantly higher if Maine offered stronger incentives.

In some cases, Maine-owned businesses have chosen to expand with new branches outside of the state due to perceived benefits elsewhere, or due to absolute necessity.

> *"We're simple, hands on business owners. We look for 3 things:*
>
> 1. *A product mix that could match the needs of the market*
> 2. *A good management team*
> 3. *Location*
>
> *Across the board, New Hampshire is a much more friendly state. We explored Vermont, New Hampshire and northern Maine. Coos County, New Hampshire, and the town of Lancaster were very helpful." Maine Forest Products Business Owner*

"We needed to be in northern Maine, so we bought 100 acres in Bridgewater and told the state that we could provide 15 jobs. There are no handcrafters (logsmiths) in Maine, but we found one 10 miles away in New Brunswick. When we asked Augusta what we needed to do to bring him across the border to work for us, they said they couldn't bring him in and that it could take 20 years to do it. So we moved 10 miles over the border and have 8-10 employees there now." Maine Forest Products Business Owner

Among out-of-state business owners of sawmills and paper mills, decisions on new investment are often based on the degree to which Maine compares to other areas in which the company owns mills. Here too, Maine often loses out.

"The burden on labor is much higher in Maine than in Canada. In a labor-intensive operation such as a sawmill, you are at a major disadvantage in Maine. If all other things are equal, you would choose to invest elsewhere." Maine Woodlands Owner

"The investment has a tendency to go where you will capture the highest return on investment. In the paper industry, they don't talk about the competitiveness of one facility vs. another. They look at machines in each facility." Paper Company Executive

Key issues that lead to the perception of Maine as business-unfriendly, and investor-unfriendly include the following:

Instability of the Legislative Process

The instability of the legislative process in Maine weighs heavily on the minds of investors. Maine is seen to favor legislation and legal action rather than pursuing collaborative negotiations between key stakeholders.

"Mainers are different. If they have some sort of controversy, they solve it through legislation." National Forest Products Association Executive

"It seems that everything is done through lawyers in Maine. Our legal bill in the US is 10-20 times higher than in Canada." Bob Pinette, VP Woodlands Division, JD Irving

The key example of legislative instability, cited by investors and bankers interviewed, is the Business Equipment Tax Refund (BETR) program. During its nine years of existence, BETR has directly influenced hundreds of millions of investment dollars in Maine. Although most would prefer that taxes on personal equipment were repealed altogether, BETR is seen as a critical incentive to investment in Maine.

"When the BETR program was originally passed, a $110 million investment was made in our mill, but that was nine years ago." Paper Company Executive

"There's an old truism that says: Capital goes where capital is loved." Maine Banker

Despite the program's success in attracting investment, it is reported to be under attack each year by members of the state legislature. Any goodwill created by the actual refunds is overshadowed in the big picture by continued attempts to reduce or eliminate it. While the program has remained intact despite some attempts to cut it, word of any negative legislative action quickly makes its way to potential investors, causing concern and uncertainty.

"My own personal observation is that things in Maine are not that bad right now, but Maine is seen as an unpredictable state. Every program is constantly under review, under attack." Paper Company Executive

There is strong support for the current discussion of eliminating the tax altogether, which would provide the type of incentives and stability most desired by the market.

"I would like to see an elimination of tax on personal property. Mills have so much personal property, it's a huge burden and may keep them from further investment. BETR goes halfway by refunding the tax, but it would be better if the tax was not charged up front." Paper Company Executive

"Keep taxes down. The BETR program gives tax refunds for production equipment. Governor Baldacci is trying to eliminate the tax altogether which would be better than the refund." Maine Sawmill Owner

Strict Regulatory Environment

Similar to the frequent legislative battles over BETR, are ongoing citizen referendums and strong regulatory rulings which are perceived by some to limit the production of wood in the state.

Although many of these referendums have not passed, and rulings such as the liquidation harvesting rule do not impact all suppliers, the strict "first-in-the-nation" regulatory situation in Maine is seen as a contributor to an unstable situation.

"Forestry referendums did a lot to impact the industry in 1996, 1997 and 2000. None of them passed, but they cost the industry $8 million to fight them and spooked a lot of people away." Paper Company Executive

"Maine is desperately trying to pattern itself after California. It's the tail wagging the dog – the southern part of the state wants to regulate the northern part of the state." National Forest Products Association Executive

The Maine regulatory process is viewed as contentious and not based in reality. Stakeholders are not seen to be on equal footing, and the solutions are not designed to match the scale of the problem.

For example, we heard numerous concerns about the contrast between the relatively small ratio of Maine forest land affected by clear cutting, and the broad reach of the liquidation harvesting regulation. Additionally, many in the industry feel that this regulation penalizes the wrong group of people:

> On the liquidation harvesting issue:
>
> *"90% of the wood I saw comes from small landowners. This whole liquidation harvesting regulation was started to stop sprawl. Real Estate developers can clear cut and sell the land. They just declare a 'change of use'." Maine Land Owner*

Industry experts would like regulators to know that by being proactive, it is possible to be both pro-environment and pro-business.

> *"The EPA is generally pretty contentious - they're born to regulate. It's the opposite in Nordic countries: They have the same commitment to the environment. But where the EPA says 'This is the type of device you need to install to reduce emissions, Nordic regulators say 'This is the goal. We don't care how you do it.'" National Forest Products Association Executive*

High Costs of Doing Business: Taxes, Healthcare, Electricity

Not far behind the perceived instability of Maine's legislative and regulatory policies, are concerns about the state's high costs of doing business. Corporate tax rates, healthcare costs and electricity costs are all among the highest in the nation. All are key considerations for investors.

> *"Workers comp is more of an issue in Maine. Our people are at a competitive disadvantage when compared to states like New Hampshire. We take home 15% less." Maine Banker*

In a commodity market, tax rates can make the difference between gaining business and losing it.

> *"Our measure is: What is the cost of tax per ton? In Maine we pay $12 per ton (minus $2 from BETR). In Arkansas, we pay $7 per ton and in Wisconsin we pay $5 per ton. That's not a particularly big spread, until you look at the number of contracts lost at $1 - $2 per ton." Paper Company Executive*

An issue compounding these high costs is the fact that many foreign competitors are not operating "on a level playing field". In countries such as China, environmental and worker's protection measures are simply not cost factors, making price competition simply impossible.

> *"The average paper mill costs approximately $1 billion to build. If you have a choice to build in a country with low labor rates and low taxes, vs. the US, which would you choose?" National Forest Products Association Executive*

> *"Throw the same regulations at them: OSHA, DEP, EPA, so we're on the same playing field." Maine Sawmill Owner*

Lack of Availability of Qualified Workers

Layoffs and business closings have significantly changed the makeup of the forest products workforce in Maine. Maine's rural landscape has also contributed to the problem historically, as the livelihood of many towns revolved around a single mill. When the mill closes, employees must move elsewhere for work, often changing occupations in the process.

> *"As mills close and rural communities shrink, the biggest issue we face is a labor pool of capable workers." Sawmill Owner*

The instability of work in parts of the industry has led many workers to steer their children to alternative, and hopefully more stable careers. The results of these changes are a declining and aging workforce – a situation which could have even more serious repercussions when these workers retire.

> *"Harvesters are getting squeezed at both ends. The younger generation doesn't want to go into the logging business." Maine Banker*

> *"Right now, there is a huge bulge of workers with an average age of 48-55." Paper Mill Executive*

A secondary qualification challenge related to the mechanization of the industry is the need for employees with college or technical degrees – something often in short supply in new recruits to the forest products industry.

> *"By and large, we give a preference to those with a degree." Paper Mill Executive*

A final issue relating to the lack of qualified workers, was the inability of Canadian loggers to enter the state due to this year's cap on H2B visas. Although the issue is federal in nature, some of those interviewed feel that state government could have done more to work towards a timely solution.

"We had a huge problem getting people to cut wood this year during the season. The problem may be eased in October with the new federal government calendar, but the woods industry doesn't operate on a federal government cycle."
Paper Company Executive

VII. BANKING PERCEPTIONS AND ATTITUDES

In the course of the project, we solicited the opinions of 14 leading lenders in the state. These banks are strongly committed to the forest products industry, as the sector comprises a strong part of the economy in Maine, and also a strong part of their portfolios.

Reductions in the number of loans provided to Maine businesses have been the result of fewer business starts and expansions, and a shift in the overall composition of the banking community in Maine.

> *"Now, a lot of small country banks are lending in areas where big banks have pulled out. Fleet and Key have moved to areas with higher population and more diversification. Unfortunately, a lot of them don't have the commercial lending expertise." Maine Banker*

Our banking and investment survey contained many in-depth questions about the ways in which lenders view forest products deals, the issues that are most important to them, and the factors that build their confidence in the industry.

Key criteria for lenders

Bankers apply standard industry lending metrics to the evaluation of any deal, whether in the forest products industry, or outside of it. While there is no specific formula, the ultimate goal is to achieve an acceptable level of return while managing an acceptable level of risk.

The most common indicators of risk and associated return are measured through due-diligence research and an analysis of:

- Cash flow
- Collateral
- Prior performance in terms of revenue profitability
- Experience and character of the management team

> *"You look at: How smart is the management team? Do they know what they're doing?" Maine banker*

The maturity of the forest products industry, coupled with the fast pace of change in the marketplace, drive bankers to consider the entrepreneurial nature of the management team and their ability to meet new challenges with innovation.

> *"Since it is a mature industry, you look at: What are they doing to stay viable - such as investing in new technology?" Maine Banker*

"It's not enough to just look at one year's performance. The companies moving forward are positioned to get large volumes that make the small margins pay off." Maine Banker

Natural resource investments do not help bankers achieve additional objectives outside of their normal lending objectives. They do, however, help the bank to build and strengthen communities in Maine. Since forest products sectors have traditionally been labor intensive, the related community benefits have been a strong added incentive to lending.

"Job creation in our market area is a key motivation. If we had limited options to make our decision – manufacturing vs. commercial real estate, we would choose manufacturing." Maine Banker

Likewise, the criteria for lending in the forest products industry are not any different than lending in any other industry. Bankers we interviewed use a consultative approach, taking a strong interest in the management of the company to insure the future of the company and a return on their investment.

Market trends during recent years have caused bankers to become more critical of deals in the forest products sector, but again, that is not unlike the increased attention given to any business seeking a loan in an uncertain business environment.

"Over the past 6-7 years, we've sharpened our pencils on this industry and tightened our standards because of the overall weakness of the market." Maine Banker

In cases of a higher level of perceived risk, bankers may turn to loan-guarantee programs offered by the Finance Authority of Maine (FAME) and the Small Business Administration (SBA) in order to guarantee portions of the loan. It was reported in a number of interviews, however, that these programs have recently tightened their standards to bank levels, making it sometimes more difficult to secure funding for a riskier candidate.

"You only bring FAME in if you really need to get supported. Those government programs are a pain since they generate a lot of paperwork. FAME credit has become as strict as a bank. If you are going to go through that much effort with your client, to get them turned around, you don't want them to get beaten on by FAME." Maine Banker

All bankers interviewed are well aware of the loan-guarantee programs that are available to them and their clients. Despite their limitations, most bankers find them to be good tools for managing risk.

"I sense FAME and the SBA are looking at these businesses like the banks are – they've done a pretty good job." Maine Banker

Level of awareness of potential deals

The lending community relies strongly on the use of networking and personal sales efforts to identify and close new deals. A commercial lender's success is directly related to his or her connections to the business community. The bank itself often supplements direct selling efforts with lead development programs. These may include hosting breakfast, lunch or dinner meetings that feature an industry expert who can provide information and or training to customers and prospects. In this way, the bank can further its brand while developing a portfolio of networked clients.

Commercial lenders do not take the selling process for granted. They spend a significant portion of their time calling on business owners and managers, as well as their business advisors, such as lawyers and accounting firms. The overall view is: If a deal becomes available in the market, you should know about it as it happens (preferably having had a hand in its creation).

> *"The difference between a successful lender and an unsuccessful one is people that have a network. An information clearinghouse wouldn't be helpful. If there is a deal happening, the company should know your name. It's your job to be out there in front of them. Our referrals come from the company's executives, or their accountant or lawyer. They should know you." Maine Banker*

For these reasons, the idea of an information clearinghouse to share potential deals was not of interest to bankers. The idea represented a low level of perceived utility, since many potential lenders would not want sensitive company information readily available to the market, and most would already have a banking relationship where they would begin their search.

> *"Very few people are involved in the production aspect of the forest products industry. Word-of-mouth is all you need. Once in a while, you get a call from a broker, but they're more of a hindrance than a help. You usually know the company name on the application when you see it." Maine Banker*

Acceptable Collateral

A more recent and significant shift in the way loans are processed is in the attitudes about acceptable collateral. In the past, equipment, along with cash flow, was a typical source of collateral accepted by lenders. During the period in which many suppliers have gone out of business, foreclosures have dumped a great deal of equipment on the used market.

When this occurs, the used market becomes flooded with equipment, and the overall value of both new and used equipment declines. As a result, many bankers are now less likely to accept equipment as a major source of collateral. Instead, they look to cash flow as the best guarantee of their money.

Ultimately, this change is a positive one for the industry, since cash flow is a much more accurate measure of a company's health and market position. Equipment may be sold to the

company under less stringent lending standards than what a bank would normally require of the borrower.

Levels of Bank Lending to the Forest Product Industry: Past, Present and Future

Most banks report fewer deals in recent years than they have seen in the past, but this change has been driven primarily by trends in the external market, rather than by internal changes in lending practices.

Due to the nature of forest products deals in Maine (e.g. long-term lending, and modest returns), banks, rather than venture capitalists, are the natural choice for borrowers. In most cases, the percentage of forest products loans in a bank's portfolio is roughly equivalent to the percentage of forest products businesses in their region vis-à-vis other business sectors. This is in marked contrast to the portfolio of a venture capitalist who typically chooses deals in specific industries to guarantee specific levels of return.

> *"The economy of Northern and Eastern Maine is primarily driven by the Forest industry, so that's where we invest." Maine Banker*

All of the bankers that we spoke to described a strong, continuing commitment to the industry and a strong interest in future lending.

> *"About ½ of our investments are in Forest Products sectors. Unlike a lot of other lenders, the health of our organization is directly tied to the health of the industry." Maine Banker*

Historic Performance of Loans to the Forest Products Industry

Financial returns of forest products loans have been directly related to the peaks and valleys of the market, as well as specific market forces driving individual sectors. For instance, manufacturing businesses have performed at lower levels than retail-related forest products businesses since they have had deeper structural issues to contend with. These include the aging of plant and equipment, and the lack of availability of qualified workers.

> *"You have to separate the manufacturing side of the business from the retail side. The retail side has been phenomenal." Maine Banker*

> *"Mills have had problems because:*
> - *The supply of raw materials has been fairly constant due to all of the import.*
> - *Land owners have been holding off on selling at low prices due to import.*
> - *Retail is consuming the supply"*
>
> *Maine Banker*

It is important to note, however, that most bankers have found the forest products industry to perform in a similar fashion to other Maine industries. The major market drivers – economic downturn and global competition – have had a significant impact on all industries. In general, the risk related to forest product loans is not reported to be higher than average, and most feel that their loans have performed well.

Deterrents to lending in the industry include macro-market issues such as regulatory and legislative instability, and micro-market issues such as poor cash-flow management or lack of a cohesive business plan.

VIII. Investor Perceptions and Attitudes

Company owners have become much more pragmatic about when, how and why to make new investments due to the global challenges they face in the marketplace. In the case of well run enterprises, reinvestments are made to increase the overall competitiveness of the company. This type of reinvestment is often a life-or-death requirement for survival in the long run.

> *"If we don't modernize, we won't make money. The mill we just bought never made money, and that's what you need to do: modernize." Sawmill Owner*

The importance of equipment upgrades and modernization cannot be overstated. Some of the most optimistic market outlooks are from manufacturers who are the most innovative. They have taken advantage of new technologies and lean manufacturing processes which allow them to "China-proof" their business to some extent. Highly automated equipment allows manufacturers to decrease the labor component of their product, thereby striking directly at the most competitive component of foreign manufacturers.

> *"Our product might be more competitive with a Chinese entry into the market – My labor is only 7% of sales. If a Chinese competitor came in with a 6% labor cost, it wouldn't make a big difference in the retail price of the product." Forest Products Business Owner*

It should be noted, however, that the other key driver of one's market outlook is the company's position in the market vis-à-vis its competitors. High-end, high-quality wood products such as furniture or cabinets are holding their own, and some of the mass-manufactured products with little labor cost such as machined wood buttons are also surviving. In most cases, the mid-range product with some element of hand-labor is being hit the hardest by imported competition.

> *"When I started business, I had 85 US vendors, now I have 5." Wood Products Distributor*

Investment incentives are very important to businesses of all sizes to help initiate the initial investment and to get the new investment paying for itself in the shortest amount of time possible.

Company owners and managers are cautious about new investments in Maine, partly based on industry trends, and partly based on what they perceive to be Maine's unfriendly business environment. Long term investments, such as large land purchases for wood supply are fewer, and much more apt to be influenced by changes in legislation or regulation.

> *"Forest products investors are gun-shy with the continued referendums on cutting. I know of at least 2 deals that have fallen through. One investor walked away from a $500,000 down payment because of it. It's inconsistent, the way regulations change in the state over a 5-7 year period. The economics of a deal could change significantly." Maine Banker*

At the paper mill level, investments in Maine have become less frequent, and the overall size of investments has trended significantly downward. There are some notable exceptions, such as the recent $110 million investment in International Paper's Jay mill, but with the cost of new equipment in the hundreds of millions of dollars, the most common approach is smaller, incremental upgrades of existing equipment. This of course breathes new life into a mill for the short term, but leaves long-term survival in question.

> *"China is not the problem in Maine. The problem is that they had the first mills built in the US, and it's not like there has been a lot of reinvestment." Investment Firm Executive*

When interviewed about the key issues and trends driving the investment picture in Maine, company owners' and managers' attitudes are directly in line with bankers. The top concerns on their minds are the instability of Maine's legislative and regulatory process, the lack of strong tax incentives for investment and the perception of higher costs of doing business in Maine.

There are some success stories, however, where the state has worked creatively with business to spur this investment. One example is the recent partnership between the state and Georgia Pacific, in which the mill needed competitive energy costs and the state needed solid-waste landfill capacity. Georgia Pacific sold its solid-waste facility to the state and is using the proceeds to build a new co-generation plant.

> *"We will invest in our new boiler-power plant over the next nine months and that will grease the skids for modernization in $1 million, $2 million, $5 million dollar chunks, rather than $200 million investments. That doesn't happen often anymore.*
>
> *The self-generation plant will allow us to get our operating costs down and make this plant competitive with its sister plants." Rick Douglas, Georgia Pacific*

It was clear to see from this example, how state cooperation and incentives to invest in infrastructure will lead to additional investments in the future in two ways: First, through the development of a more competitive plant, and second, through increased confidence in the credibility and reliability of state government.

> *"Georgia Pacific did not have a favorable view of Maine and that came from the executives in Atlanta. The governor worked diligently to save the mill and did very positive things that astounded our executive management. Jack Cashman [Commissioner, DECD], Alan Stearns [Senior Policy Advisor to Governor Baldacci], and Governor Baldacci have been huge friends to us." Rick Douglas, Georgia Pacific*

"The biggest change needed is an attitude change." *Maine Banker*

We asked all of the bankers, company owners and market experts to comment on what they would recommend as solutions to the problem. To be fair, we asked both what the state could do to improve the situation, and what the industry could do. Despite their different vantage points in the market, respondents spoke with a singular voice.

"Focus on ways to make Maine a better place to do business."

Specific recommendations fall under four key headings:

1. Develop stability regarding referendum process
2. Develop regulatory stability
3. Create investment incentives
4. Strengthen infrastructure and provide business support

1. Develop Stability Regarding Referendum Process

- Raise the bar on requirements to put a referendum on the ballot

One of the major sources of instability is seen to be the referendum process. Those interviewed agree with the democratic principle of citizen referendums, but they would like to see requirements for:

- A larger number of signatures to initiate a referendum
- A higher percentage of signatures from areas that will be affected by the vote
- An evaluation of stakeholders, and the value of their stake in the proposed referendum

"When regulations are proposed, bring in all of the stakeholders. Limit the stakeholders to those who have an investment in the outcome. Environmental groups have nothing to lose." Sawmill Owner

- Guarantee stability of raw materials supply

Maine's forests are at the beginning of the supply chain, and many in the industry feel that the state needs to build a greater understanding of the need for industrial forestry practices which will guarantee a steady, well-priced source of wood.

"We have real concerns about the Department of Conservation and the Maine Forest Service. There is a lack of understanding about industrial forestry. They favor a low-intensity management approach. This is European-style forestry, a light-touch approach."

"The intensity of forest management is much lower in Maine than in Canada or other parts of the US. The Forest Products Act limits forest management to a small part of your land."

"The US federal tax system does not allow the intensive depreciation of your investment. In Canada, tree planting can be deducted as an expense. In the US, it's an investment and you pay taxes on it."

- Solve problems cooperatively with industry, rather than through legislation

The legislative process is seen as just another example of the litigious environment in the state. Some in the industry noted a dangerous precedent being set with bill LD 1318, in which the state has intervened in collective bargaining between loggers and landowners. The overall industry would prefer to settle its own disputes from within, without intervention from the state.

"It gets dangerous when government intervenes and starts to set industry rules." Maine Banker

2. Develop Regulatory Stability

- Streamline the environmental permitting and regulatory process

The length of time it takes to move through the environmental permitting process is cited as a major deterrent to investment. **In fact, we heard numerous stories of other states whose economic development teams had courted companies who were having challenges with Maine's strict laws.**

"Permitting is a problem on the environmental side. Anything to speed the process. If someone wants to invest today, they may need to wait until next year to get environmental approvals." Maine Banker

- Develop a strong economic analysis of the problem and its solution before deciding on new regulations

Industry leaders do not always see Maine's regulatory authorities as having a strong understanding of the economic repercussions of regulations before they set them.

"If they are going to throw regulations at us, they need to do an economic analysis and pay attention to it.

- *Do a scientific analysis of the problem*
- *Develop an economic analysis of the issue*
- *Develop a true understanding of who the stakeholders are"*

"The DEP needs to make a fundamental change. They need to look at the costs of 'nice to do things' vs. the things that truly need to be done."

"The forest industry is out of balance in terms of where state government stands. They're focused on more preservation, so a smaller group can enjoy it recreationally. It's policy by outdoor enthusiasts, rather than those who manage the woods."

"Maine is not looking at manufacturing from a business point of view, they're looking at it from a tourist's point of view."

3. Create Investment Incentives

- Provide tax and investment incentives and eliminate the personal property tax on business equipment

The elimination of personal property taxes is the key target to provide incentives for re-investment and to attract new investment.

"If you're considering a $50 million investment, you can factor in a $600,000 difference on your pro forma with the BETR program. But I have to tell my management: 'there's a bill pending to eliminate BETR but it's not going to pass'. They still have concerns that something is pending. The bottom line is that there is no certainty. Legislators may put a bill in to raise discussions, but it raises hairs on the backs of investors." Paper Company Executive

"Maine has a TIF (Tax Increment Financing) program where the town rebates taxes paid on new buildings. We got approval for it and we are planning on building a new plant." Sawmill Owner

"What often happens in Maine is that the mill shuts down, someone comes in and restarts it, and then the mill shuts down again. It's a boom and a bust. That's because the technology is old. There needs to be some tax incentive for re-investment." Paper Company Executive

- Promote existing business development incentives and programs more effectively

Banks feel that most investors do not have a strong enough knowledge of the programs that *are* available to them from the state. Although banks advise their customers of these programs, more loans may be initiated if borrowers knew of their options up front. A greater promotion of available state incentive programs by the DECD is recommended.

> *"There should be a centralized area in the state that explains markets that are unusual or attractive. We have empowerment zones where companies get $3,000 for each new employee. We're 2 years into it and the average company coming into Maine doesn't know about it. This type of information needs to get to prospective companies early on." Maine Banker*

> *"The DECD needs to play a greater role in business development." Maine Banker*

4. Strengthen Infrastructure and Provide Business Support

- Support the development of infrastructure

Maine's infrastructure is widely regarded to be lacking for an industry that is as transportation-intensive, capital-intensive and labor-intensive as the forest products industry. The development of infrastructure is no small request, but it is a key differentiator between markets that investors may choose from.

> "*I think that the Maine government has to be responsible for the infrastructure to create a fertile environment where businesses can succeed:*
>
> - *Power costs*
> - *The condition of roads*
> - *The capacity of roads*
> - *Labor laws to hire and retain employees*
> - *Rail, air and shipping access"*
>
> *Work with the Federal Government to allow heavier truck use on highways. Our best roads have the strictest limits. Our costs increase when we have to use secondary roads or reduce our loads." Sawmill Owner*

- Become an advocate for investors – like your competitors do

> *"I would like to have the Department of Economic and Community Development walk permits through the departments. You go to other states like New Hampshire, and the Carolinas, and it's almost like they have a consultant working with you."*

- Provide training programs and incentives to guarantee the quality of the workforce and the management

  "What may be brought to the industry is some sort of advocacy or consulting. We've done suppers for sawmill owners with a consultant that gives a presentation on issues specific to them." Maine Banker

X. INDUSTRY ACTIONS

Bankers, company managers and market experts all recognize that they, too, have a large responsibility when it comes to rebuilding the health of the industry. In many ways, Maine's individualist, go-it-alone approach to business is good for the entrepreneur in a new market, but it can be a liability in a mature industry.

The issues that the industry feels are most important to address itself, are the following:

- Companies need to work cooperatively to strengthen the overall industry

  "We need to work together better to put deals together. I recently talked with a company out of Quebec about putting in a new sorting system. They brought in a Canadian electrical contractor and an installer to provide a complete package of services. They look out for each other more than we do." Sawmill Owner

- Promote training programs – partner with technical colleges and universities

JD Irving has taken the challenge of qualified workers into its own hands by partnering with Maine colleges to develop forest products educational programs – a move that is viewed as a good model for the industry.

- Build a strong working knowledge of the global forest products market

Companies who compete in a global fashion are well aware of the ways in which their competitors are innovating. It is acknowledged that not enough competitive research is being done in the market. Industry tradeshow attendance and the trade missions offered by the Maine International Trade Center are seen as critical steps to encourage business development and flexibility.

- Develop value-added product niches and innovate continuously.

The development of new product niches is critical to success in a commodity market. In fact, this is the strategy that most of the existing paper mills in Maine have taken to compete, offsetting the liability of their aged equipment. Production has been shifted from a "push" operation, where the mill produces large quantities and then finds markets for them, to a "pull" operation, where product is made to order. This is known as a demand-driven supply network.

"It's certainly a global marketplace and the industry is redefining itself. It's more into specialty products now, and filling customer orders. The industry needs to move quickly to meet the specifications of the specialty customer." Paper Company Executive

- Support good forestry practices

This effort was noted by many as a way for the industry to help reduce its own costs by avoiding costly regulatory litigation and injury claims that could result from unsafe working conditions.

XI. Analysis and Recommendations

The forest product industry is a huge contributor to Maine's Gross State Product, but it is an industry facing serious threats. Market fluctuations have historically contributed to a boom or bust environment, but the commoditization of the industry along with intense global competition has strained businesses in unprecedented ways.

Maine has always prided itself on being a resource-based economy, and therefore the Maine state legislature and state government must make a concerted effort to understand the unprecedented challenges facing the industry, and the potential loss to the state if it is allowed to decline.

This industry is much too large to be ignored, as it represents the largest manufacturing industry in Maine, at over $6 billion in annual revenues – far more than agriculture or fishing.

We conclude our analysis of the industry investment situation by distilling our findings and recommendations into a workable set of recommendations that can be followed to provide the right type of support to existing businesses and future investors.

1. **Follow through with the Governor's plan to eliminate personal property taxes on business equipment**

This one step would make a huge impact on the confidence of investors from within, and outside of Maine. The elimination of this tax would create the ultimate level of stability in taxation that investors base their decisions on.

"There's a lot of iron in the state. It just needs to be upgraded." National Forest Products Association Executive

> *"If we received tax incentives, we'd spend it right back into the mill modernizing equipment." Sawmill Owner*

2. **Review the concept of an additional tax credit for new technology development and sharing**

We recommend strong state-level support for Maine forest products businesses that develop globally competitive technology that can help others in its sector to become more efficient and therefore more competitive. The goal of this recommendation is to foster innovation and cooperation between Maine forest products companies, to strengthen entire sectors instead of just individual companies.

3. **Develop a state-level business development action plan to provide industry support for each component of the forest products sector**

The proposed business development action plan would be similar to strategic plans created by major corporations for each of their divisions. This process would ultimately provide a greater understanding of the industry for state legislators and regulators, while strengthening the working relationship between state and industry. We believe that this type of strategic planning would lead to greater stability in the legislative process as a result.

Ideas for the action plan include:

- Setting goals for contribution to state GSP, that each industry sector should provide

  "The state needs to determine over time: What kind of state do we want to be? They need to develop a strategic plan to position themselves for the next 50 years and ask: Are we in those sectors now? If not, what do we have to do to get into them?" Investment Firm Executive

- Cataloging the age of paper mill machinery to identify vulnerabilities, and developing strategies to encourage reinvestment where needed – these may include tax credits

- Creating a fast-track approval program for environmental permits by considering all possible scenarios in advance

- Coordinating government trade missions to other states and countries that are renowned for regulatory stability and strong working relationships between state government and industry

- Supporting infrastructure enhancements to help lower costs in key trade corridors

- Developing cost effective options and group buying plans to lower healthcare and electricity costs

4. Support federal efforts that level the playing field with foreign competitors, including the use of countervailing tariffs and similar measures

"If the state creates an equal playing field for companies to compete globally, the rest will take care of itself." Sawmill Owner

"Whether anyone wants to admit it or not, we do need protections."

5. Develop an industry-sponsored awareness and brand-positioning campaign to educate Maine citizens on the importance of the industry to the state's economy – similar to the American Beef Producers' "Beef. It's What's for Dinner."

This type of campaign would provide a very important show of solidarity and strength in the industry, which is critical to helping Maine citizens understand the impact of their votes on key

industry issues. A branding campaign would also draw all related constituencies together toward a common goal for the common good.

6. Ensure Maine state government support for:

a. Actively soliciting proposals for specific new technologies that can further the competitive position of the industry

b. Keeping the industry regularly apprised of global innovation and technology developments

c. Helping to find new markets for Maine companies both within and outside the US

d. Providing marketing assistance and training for Maine forest products companies, rewarding those that have developed new value-added niches

e. Promoting Maine and its forest products companies at industry tradeshows

"At the International Woodworking Fair (in Atlanta), Kentucky, Louisiana and West Virginia all had big booths at the show to encourage people to do business in their states. Kentucky will almost give you a building if you move there. They were advertising 1%, 10 year loans because they realize it means employment for their people." National Forest Products Association Executive

f. Hosting Governor's conferences on global forest technologies to attract global experts to the state

7. Support, strengthen and develop industry training programs through the departments of Labor and Conservation.

Provide active support for safety and certification programs which helps to improve efficiency and lower costs

Partner with Maine colleges and universities to develop forest products business programs that can complement technically-oriented forestry programs

"Because I'm a forester and a conservationist, the thought of losing our industrial base terrifies me – there will be no incentive to maintain our forest land."
John Heisenbuttel, American Forest & Paper Association

"Our goal is to create a sustainable, balanced, multi-use forest."
Patrick Strauch, Maine Forest Products Council

RESULTS OF PUBLIC SURVEY
STRATEGIC MARKETING SERVICES

REPORT TO

INNOVATIVE NATURAL RESOURCES SOLUTIONS

AND

THE MAINE DEPARTMENT OF CONSERVATION

SMS OMNIBUS POLL™

PROPRIETARY QUESTIONS

OCTOBER 2004

STRATEGIC MARKETING SERVICES

PORTLAND, MAINE

FACTS ABOUT THE
QUARTERLY STRATEGIC MARKETING SERVICES (SMS) OMNIBUS POLL™

The most recent Strategic Marketing Services (SMS) Omnibus Poll™ was conducted between September 23rd and 27th, 2004. All interviews were completed at the SMS Interview Center by our in-house interview staff. This omnibus survey is the **thirtieth** in a series of ongoing quarterly omnibus surveys conducted by SMS since September 1996. **Since we have conducted this poll quarterly over the past eight years, we are in a unique position to provide reliable benchmarking on a range of important issues.**

A randomly selected, computer generated stratified statewide sample of 400 Maine adults was interviewed. The sample was stratified based on the U.S. Census of Population and Housing. The survey was administered to people who are registered voters and who identified themselves as 'likely' voters in the November, 2004 elections. **The sample size has statistical significance of ± 4.9 percent at the 95 percent confidence level.**

It should be noted that figures may not always equal 100.0 percent due to rounding of decimals.

SMS (formerly a division of Guy Gannett Publishing) is the quantitative and qualitative marketing research division of Pan Atlantic Consultants, Maine's largest independent marketing research and business consulting firm.

Most Significant Benefit of Forest Products Industry in Maine

Which of the following do you feel is the most significant benefit of the forest products industry in Maine? Which is the second most significant benefit? [Options were rotated]

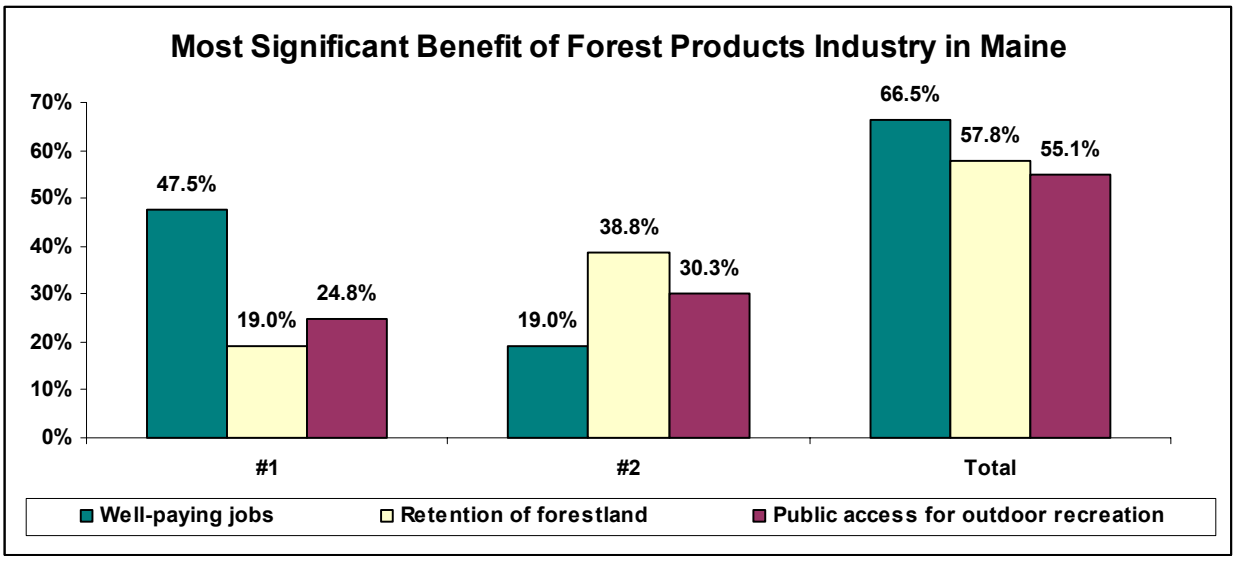
When asked what they feel is the most significant benefit of the forest products industry in Maine, 47.5% of respondents said "well-paying jobs", followed by "providing public access for outdoor recreation" (24.8%) and "retention of large tracts of forestland" (19.0%). With regard to the second most significant benefit, 38.8% of respondents chose "retention of large tracts of forestland", 30.3% said "providing public access for outdoor recreation", and 19.0% said "well-paying jobs". Overall, "well-paying jobs" was cited as the most significant benefit of the forest products industry in Maine (66.5%).

Most Significant Benefit of Forest Products Industry in Maine:

(N=400)	#1 Benefit	#2 Benefit	Top Two Combined
Well-paying jobs	47.5%	19.0%	66.5%
Retention of large tracts of forestland	19.0%	38.8%	57.8%
Providing public access for outdoor recreation	24.8%	30.3%	55.1%
Don't know	8.8%	12.0%	N/A

Source: Strategic Marketing Services, Portland, Maine

Figure 149. Most Significant Benefit of Forest Products Industry in Maine



FINDINGS

Health of Forest Products Industry in Maine

How would you rate the health of the forest products industry in Maine using a scale from 1 to 5, where 1 represents a dying industry that will not have a significant influence on the future of the Maine economy and 5 represents a healthy industry that will grow in the future?

A total of 20.3% of respondents rated the health of the forest products industry in Maine as "healthy" (4 [15.5%] and 5 [4.8%]) while a total of 32.0% rated it as "dying" (2 [20.0%] and 1 [12.0%]). Thirty-seven percent of respondents (37.0%) were "neutral" on this issue, and 10.8% were undecided. Overall, respondents rated the health of the forest products industry in Maine as slightly "dying" (mean = 2.79).

Residents of Northern Maine (40.0%) were more likely than residents of Southern (30.3%) or Central/Western (26.9%) Maine to rate the health of the forest products industry in Maine as "dying".

Health of Forest Products Industry in Maine:

(N=400)	September 2004
1 – Dying industry	12.0%
2	20.0%
3 – Neutral	37.0%
4	15.5%
5 – Health industry	4.8%
Don't know	10.8%
Mean response	2.79

Source: Strategic Marketing Services, Portland, Maine

FINDINGS

Forest Products Industry in Maine Economy

How important do you believe it is to maintain the forest products industry as a significant component of the Maine economy?

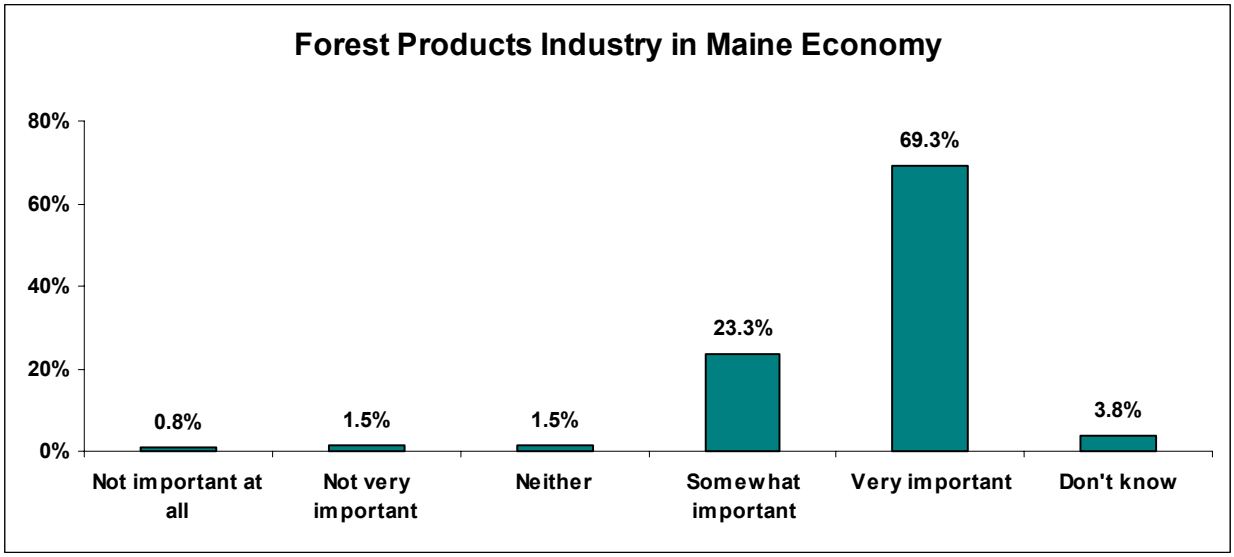
A total of 92.6% of respondents think that maintaining the forest products industry as a significant component of the Maine economy is "very" (69.3%) or "somewhat" (23.3%) important. While 1.5% said that it is "neither important nor unimportant", only 2.3% of respondents said that it is "not very" (1.5%) or "not at all" (0.8%) important. Overall, respondents feel that is very "very important" (mean response = 4.65).

Forest Products Industry in Maine Economy:

(N=400)	September 2004
1 – Not important at all	0.8%
2 – Not very important	1.5%
3 – Neither important nor unimportant	1.5%
4 – Somewhat important	23.3%
5 – Very important	69.3%
Don't know	3.8%
Mean response	4.65

Source: Strategic Marketing Services, Portland, Maine

Figure 150. Importance of Forest Products Industry in Maine Economy



Change Tax Policy to be More Competitive

To what extent do you agree or disagree with the following statement:

Maine should change tax policy relating to the forest economy to make it more competitive with other states.

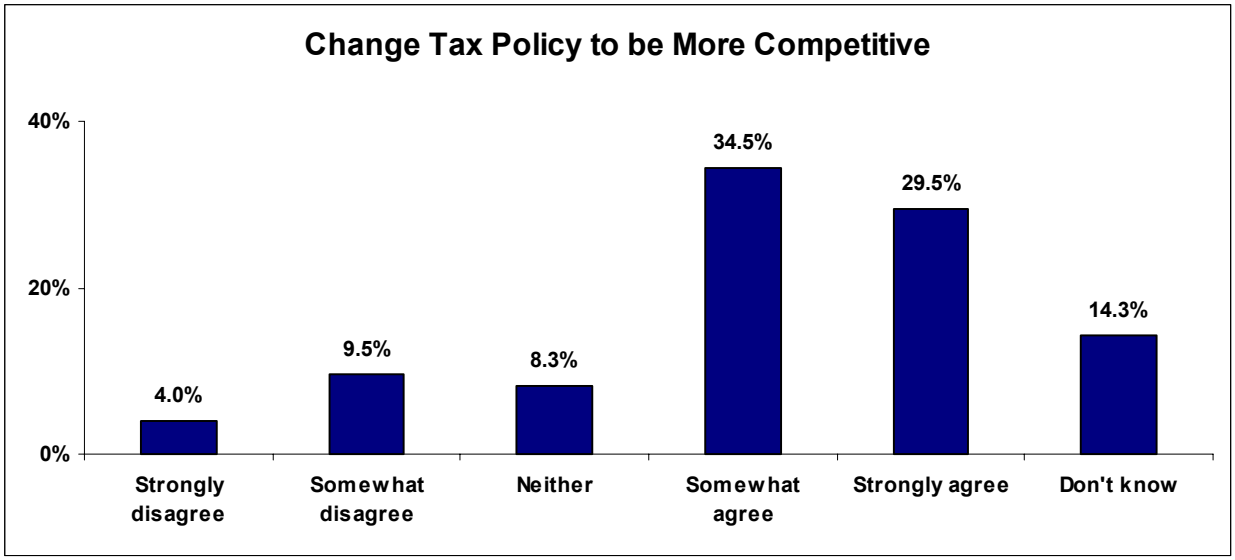
A total of 64.0% of respondents either "somewhat" (34.5%) or "strongly" (29.5%) agree that Maine should change tax policy relating to the forest economy to make it more competitive with other states. While 8.3% of respondents "neither agree nor disagree" with this statement, only 13.5% either "somewhat" (9.5%) or "strongly" (4.0%) disagree with it. Fourteen percent of respondents (14.3%) were undecided. Overall, respondents agree with this statement (mean response = 3.89).

Change Tax Policy to be More Competitive:

(N=400)	September 2004
1 – Strongly disagree	4.0%
2 – Somewhat disagree	9.5%
3 – Neither agree nor disagree	8.3%
4 – Somewhat agree	34.5%
5 – Strongly agree	29.5%
Don't know	14.3%
Mean response	3.89

Source: Strategic Marketing Services, Portland, Maine

Figure 151. Support for Change to Tax Policy to Make Forest Industry More Competitive



FINDINGS

Invest in New Technologies

To what extent do you agree or disagree with the following statement:

Maine forest product companies should invest in new technologies to remain competitive.

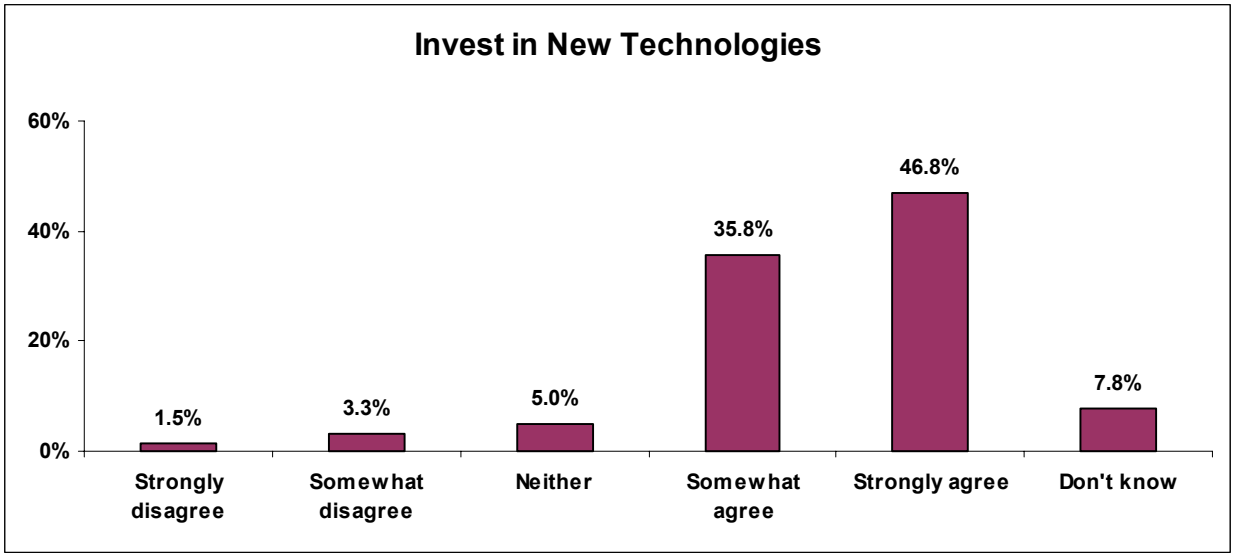
A total of 82.6% of respondents either "somewhat" (35.8%) or "strongly" (46.8%) agree that Maine forest product companies should invest in new technologies to remain competitive. While 5.0% of respondents "neither agree nor disagree" with this statement, only 4.8% either "somewhat" (3.3%) or "strongly" (1.5%) disagree with it. Eight percent of respondents (7.8%) were undecided. Overall, respondents agree with this statement (mean response = 4.33).

Invest in New Technologies:

(N=400)	September 2004
1 – Strongly disagree	1.5%
2 – Somewhat disagree	3.3%
3 – Neither agree nor disagree	5.0%
4 – Somewhat agree	35.8%
5 – Strongly agree	46.8%
Don't know	7.8%
Mean response	4.33

Source: Strategic Marketing Services, Portland, Maine

Figure 152. Support for Forest Industry Investment in New Technologies.



Invest Public Dollars to Improve Health of Forest Economy

To what extent do you agree or disagree with the following statement:

Maine should invest public dollars to improve the health of the forest economy.

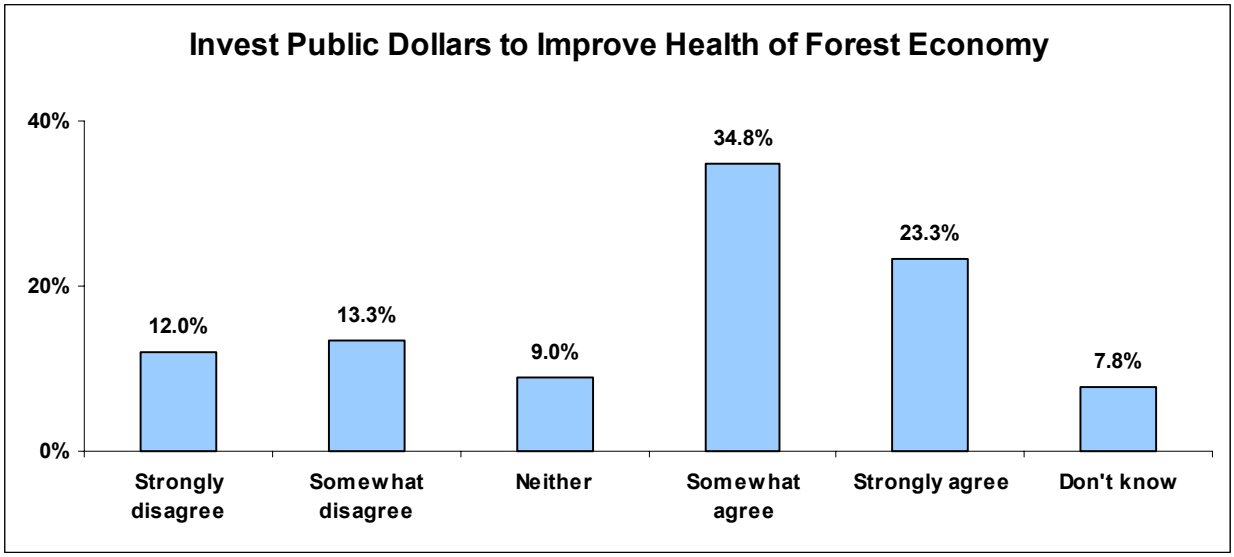
A total of 58.1% of respondents either "somewhat" (34.8%) or "strongly" (23.3%) agree that Maine should invest public dollars to improve the health of the forest economy. While 9.0% of respondents "neither agree nor disagree" with this statement, only 25.3% either "somewhat" (13.3%) or "strongly" (12.0%) disagree with it. Eight percent of respondents (7.8%) were undecided. Overall, respondents slightly agree with this statement (mean response = 3.48).

Invest Public Dollars to Improve Health of Forest Economy:

(N=400)	September 2004
1 – Strongly disagree	12.0%
2 – Somewhat disagree	13.3%
3 – Neither agree nor disagree	9.0%
4 – Somewhat agree	34.8%
5 – Strongly agree	23.3%
Don't know	7.8%
Mean response	3.48

Source: Strategic Marketing Services, Portland, Maine

Figure 153. Support for Investment of Public Money to Support Maine Forest Industry.

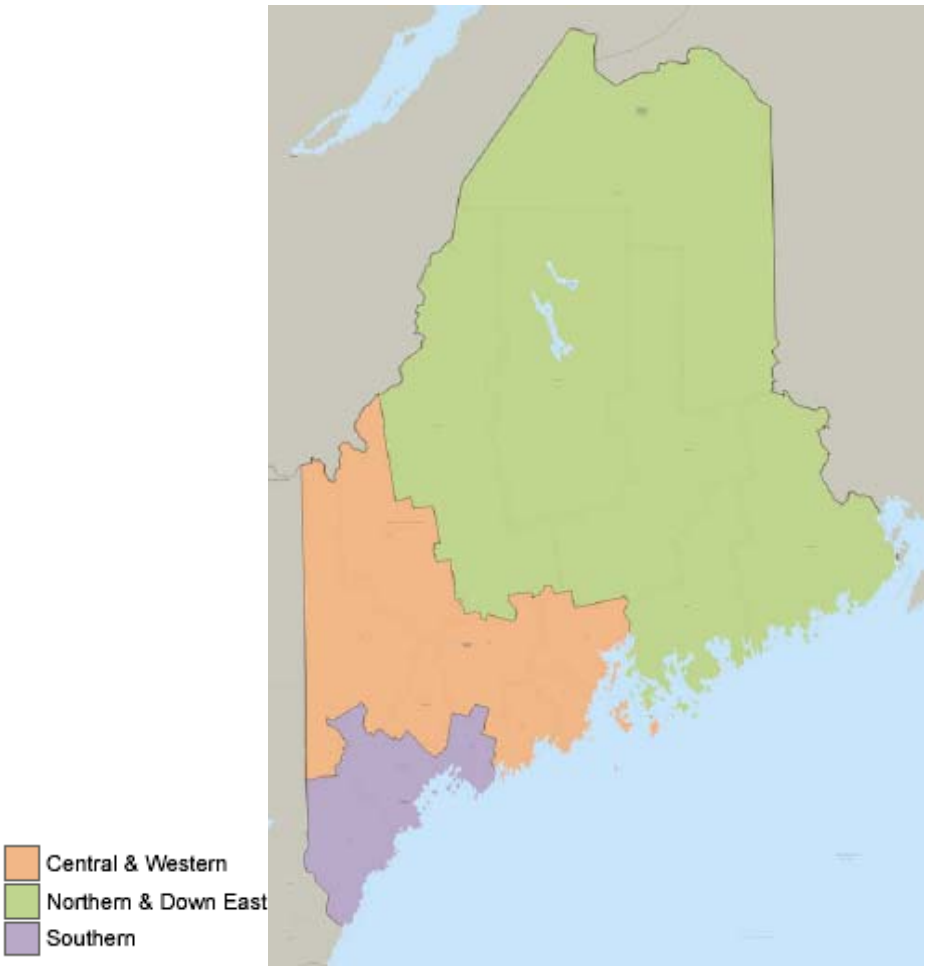


In addition to the authoring the survey report above, Strategic Marketing Services (SMS) provided Innovative Natural Resource Solutions detailed information on how survey participants responded based upon their geographic location in the state. INRS has taken this information from SMS and created the charts below.

The SMS poll groups respondents into three geographic regions:

- **Southern Region:** Cumberland, York and Sagadahoc Counties;
- **Central & Western Region:** Androscoggin, Franklin, Kennebec, Knox, Lincoln, Oxford and Waldo Counties; and
- **Northern & Down East Region:** Aroostook, Hancock, Penobscot, Piscataquis, Somerset and Washington County

Figure 154. Geographic Regions for SMS Survey of Public Attitudes



Interestingly, respondents had similar attitudes on all questions across the three geographic regions.

Figure 155. Survey Response to Benefits of Forest Products Industry Question by Region

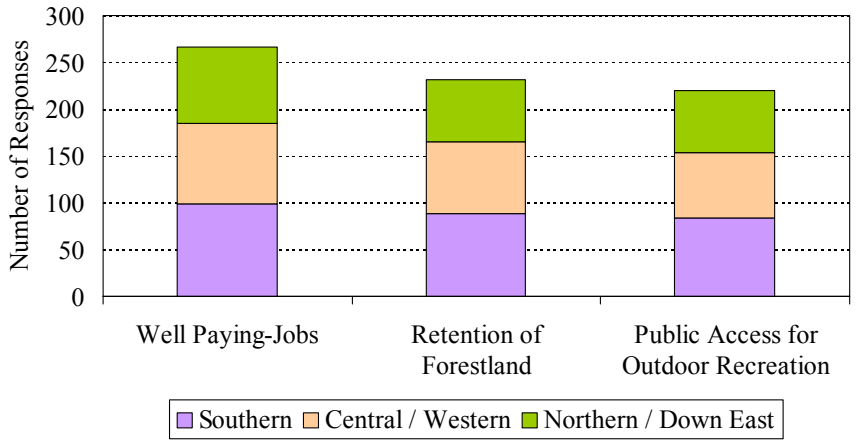


Figure 156. Survey Response to Health of Forest Products Industry Question by Region

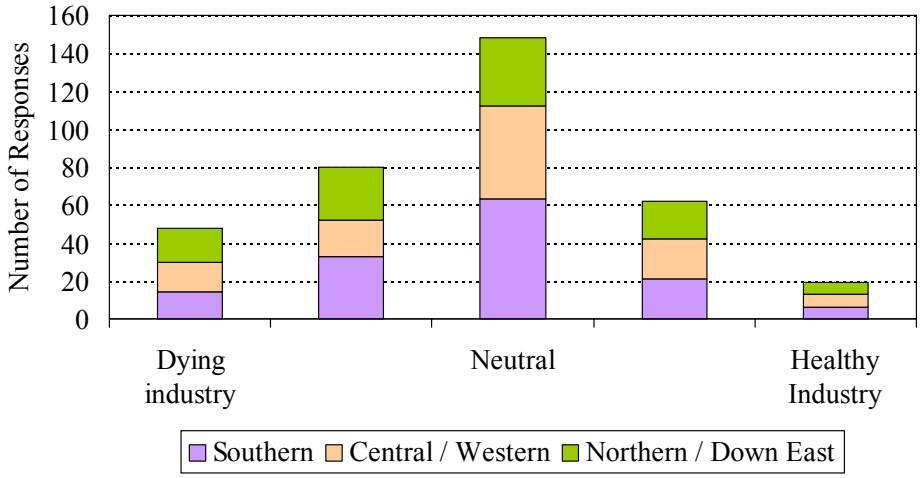


Figure 157. Survey Response to Economic Importance of Forest Products Industry Question by Region

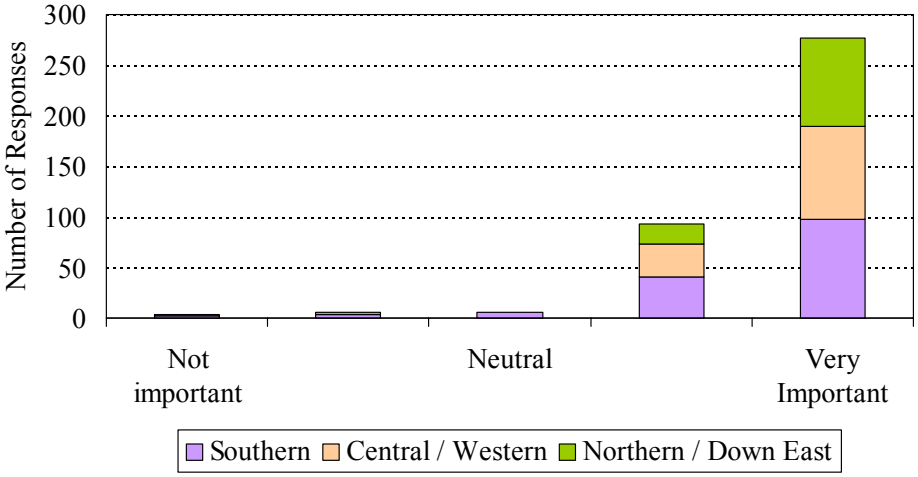


Figure 158. Survey Response to Change in Tax Policy Question by Region

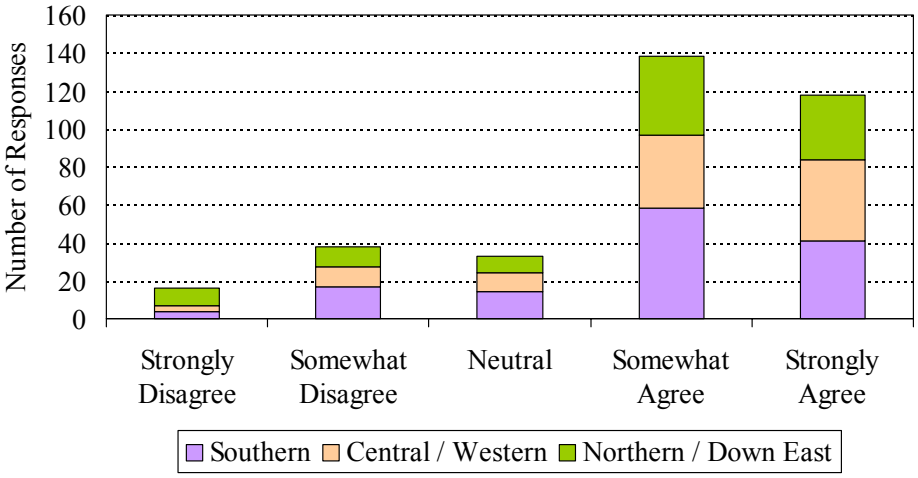


Figure 159. Survey Response to Investment in New Technology Question by Region

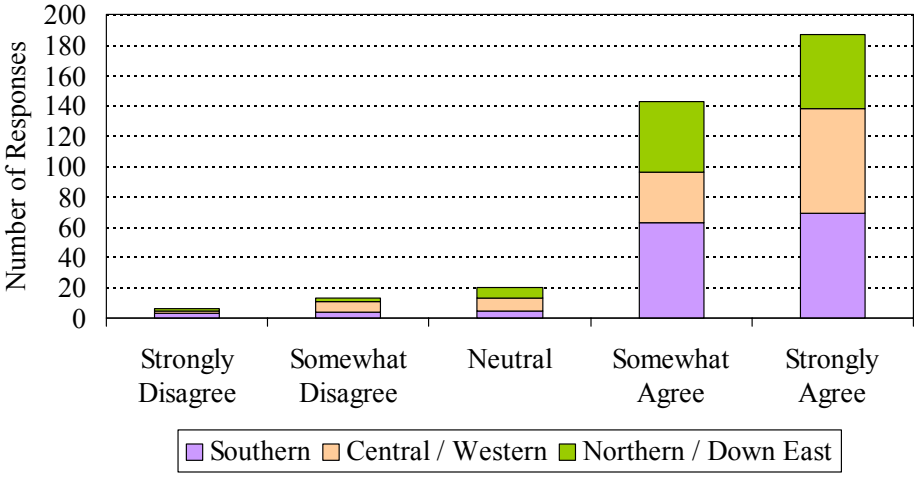
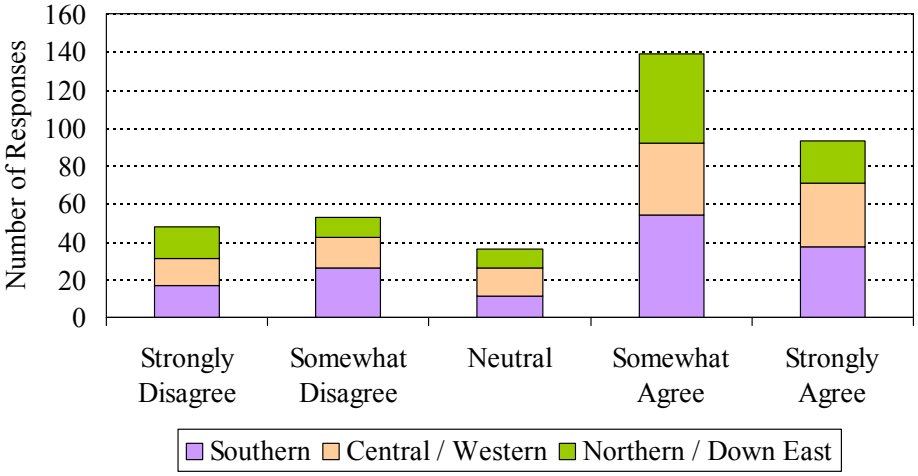


Figure 160. Survey Response to Investment in Public Dollars Question by Region



RECOMMENDATIONS FOR ACTION

Recommendations for Action

Maine's forest products industry is facing unprecedented challenges in today's global economy. Yet, many sectors of the Maine forest industry are producing as much or more product than recent historic averages. As an *industry*, forest products manufacturers have continued to invest, innovate, and produce. The opportunity to build upon the existing strength of Maine's forest industry cannot be lost.

The forest products industry, and individual sectors of the industry, face very real challenges today. These challenges did not appear overnight, and they will not be eliminated overnight. Only through a sustained and concentrated effort and building upon its existing strength can we expect a vibrant and dynamic forest products economy twenty years from today. Similarly, the forest products industry faces some challenges that come from well outside the boundaries of the state, and some that have arisen due to the forces of the global marketplace. Maine government and industries cannot use as an excuse the fact that some things are beyond our reach. Maine government and industry must focus efforts on addressing all of the things within their reach, *because* it can address these variables in an effort to compete globally.

The following recommendations are designed to provide a roadmap for both state government and the forest industry going forward. By addressing these challenges and seizing these opportunities, each of which is based upon findings earlier in this report, Maine will position itself as a place that welcomes forest industry, allows and invites innovation, and works collaboratively to address challenges as they arise.

Throughout this project, INRS received input from a wide variety of companies and individuals on what action steps might be taken to help improve the competitive position of forest product manufacturers in Maine. Many of these ideas are reflected here, others are not. INRS has strived to identify those recommendations that can be realistically implemented, do not pit one sector of the forest industry against another, and will have a meaningful impact. INRS is concerned that a long "laundry list" of recommendations would discourage, not encourage, action, and for that reason has been selective in the recommendations it puts forward.

Encourage Capital Investment

1. **Improve Maine's investment climate through prospective elimination of the personal property tax on business equipment.**

The single most important thing that Maine can do to improve the long-term prospects of the state's forest industry is encourage investment in existing and new facilities. Such investment can be used to improve the manufacturing process, produce new product lines, increase utilization of the raw material, and increase production. In today's globally competitive environment, investment in new technology is the best, in many cases the only, way for commodity producers to compete with low-cost producers in other areas of the globe. Investment in technology often allows forest product manufacturers to mitigate the relatively high costs of labor and energy found in Maine, and improves utilization of raw material.

To encourage new investment, Maine's current tax environment should become more conducive to capital investment. Maine taxes personal property used in manufacturing (i.e., machinery used to produce goods), a disincentive to purchasing and installing new capital equipment. To its credit, Maine does have a program that reimburses companies for most capital investment made since 1995, the Business Equipment Tax Refund (BETR). While this does provide some level of tax relief, a number of forest industry leaders and lenders have indicated that they have serious concerns about the stability of this program. When enacted, BETR helped encourage new capital investment in forest industries across the state. Since that time, there have been regular attempts to reduce, delay, or eliminate the program. These efforts have been largely unsuccessful, but had an unintended impact. Many investors now do not have full confidence that the BETR program will last the lifetime of their investments, and as such are reluctant to make major new investments.

As a clear and unmistakable signal to Maine forest industries (and other manufacturers) that Maine wants and welcomes new investment, the state should repeal the personal property tax on equipment. This should apply to all new manufacturing equipment. It is also critical to continue providing exemptions – either through a repeal of the tax or continued BETR payments – to equipment that currently enjoys participation in the BETR program to the extent already anticipated to honor previous commitments made.

There is no doubt that this will cause a loss of future tax revenue to municipalities, some of which must be made up from state sources. State and local officials must view this as an investment in the future economic health of the community, just as industries view the capital investment as a necessary part of their future viability and success. With a prospective repeal, municipalities would not lose money they are currently counting on, but would see healthier industries in their communities along with the many benefits that a healthy forest products industry provides. Maine has developed tax policy to support specific industries, such as banks and financial services companies, with great success[230]. Given the importance of forest products

[230] Ewing Marion Kauffman Foundation. *Promoting and Supporting an Entrepreneurship -Based Economy in Maine.* December 20, 2002

industries – and all manufacturing – to Maine's economy, the repeal of this tax makes sense for Maine's future, and should be implemented as soon as possible.

Work Collaboratively to Create Predictability and Policy Stability

2. Improve the relationship between Maine's forest products industry and state government and other stakeholders, and work toward a common goal of a vibrant, sustainable forest industry in Maine.

While difficult to measure, it is clear that the relationship between Maine's forest industry, state government and other stakeholders can be improved. In the survey of Maine forest industries and conversations with industry leaders, it is apparent that there is a great divide between the forest industry and Maine state government. It is safe to say that this divide exists with other stakeholders as well. While this is not new, it is not healthy for any party's interests. Maine's forest products manufacturers are a significant part of the state's economic and environmental future, and a strong relationship based upon mutual understanding benefits everyone.

It is not our intent to determine how this relationship has broken down over time. Focus on the past is not necessarily helpful here, and improving the relationship is far more important than studying how the relationship deteriorated. It is the responsibility of all parties to take steps to improve this relationship.

In our conversations with Maine forest industries, a number of factors were brought up[231]:

- A belief that when matters dealing with forest industry are considered by state officials, individuals with little, no or even antagonistic relationships to forest products manufacturers are given more influence than is reasonable;
- Concerns that when the industry participated in some "stakeholder" processes, they were not fully listened to and did not have much, if any, influence on the outcome; and
- A belief that individuals employed in state government, particularly regulatory agencies, do not understand and appreciate the pressures that forest product manufacturers face, and view them as entities to be controlled – not businesses that can be viewed as partners.
- A belief that some in the environmental community use controversies over forestry issues to increase support for their organizations.

From a state government perspective, a number of state officials -- both appointed and career – express frustration with forest industry action over time. INRS heard a number of examples where state officials believed that forest industry had mislead them or "cried wolf" about the impact of certain regulations. Many of these state officials have lost confidence in the credibility of the forest products industry. Some environmental organizations (ENGOs) have even stronger feelings regarding the forest products industry. The ENGOs should recognize that a robust and diverse forest products industry is important not only to Maine's economy but to the health and

[231] This description places emphasis on the beliefs of the forest products industry because this is the group that was systematically interviewed as part of this project and who the state is seeking to influence in making investment decisions.

integrity of Maine's forests. ENGOs should open avenues of communication to work collaboratively with the forest products industry to resolve issues.

This project (Maine Future Forest Economy Project) and the Governor's Advisory Council on the Sustainability of the Forest Products Industry are important and meaningful steps to rationally consider how Maine can work with its forest industries to improve their economic future for the benefit of the companies and all Mainers. These projects are not enough. Concrete steps on the part of state government to help improve overall industry economic conditions will be a strong signal. Similarly, Maine forest industries would be well served to identify discrete, addressable issues that they have with state government, rather than issuing vague complaints of "over regulation", and be prepared to address issues of concern to the public before they get to the point where there is a widespread call for regulation.

Specific steps might include:

a. Identifying and addressing public concerns as early as possible;
b. Stakeholder agreement on a desirable outcome and reasonable timetables;
c. Voluntary industry action to address issues of concern; and
d. Regulatory patience while voluntary measures are developed, implemented and evaluated.

While recognizing that this is difficult to quantify, the importance of the state's forest products industry and Maine state government having an honest, working relationship cannot be overstated. A cultural change on the part of all parties is needed if the public interest is to be well served.

3. Provide for a high-level state staff member who has credibility and relationships with all state agencies and is responsible for coordination of efforts to address issues within the forest products manufacturing sector.

The current structure of Maine's state government leaves the economic development component of forest products manufacturing underserved. Through conversations with a number of forest products manufacturers, it has become clear that while both the Maine Forest Service (MFS) and the Department of Economic & Community Development (DECD) have some level of expertise and responsibility, neither has fully served this constituency. This is largely because funding for such a focused effort ended years ago.

It is INRS' observation that to some extent the MFS defers to DECD on economic development issues, and DECD defers to the MFS on forest industry issues. This has left many forest manufacturers believing that they are not receiving the attention that an industry the size of the forest products sector deserves. It should be noted that in the past year, DECD has spent significant time and resources working on several high-profile paper mill issues. However, a focus on particular mills is not the same as a focus on the industry, and all of its sectors.

Similarly, both the MFS and DECD have task forces or committees reviewing the forest products industry. This report has its roots in one of these efforts. These are laudable and productive efforts, but are not a substitute for a dedicated staff person who – day-to-day – tracks the forest

industry and works closely with it to understand and address challenges and seize upon opportunities.

INRS recommends that Maine state government invest in a new position of "Forest Products Manufacturing Specialist", whose responsibilities would include:

- Tracking the global, national, regional and local markets that exist for Maine forest products, so that Maine can be aware of the changing market forces and anticipate how they might impact forest industries;
- Serve as an information source on forest products manufacturing within state government;
- Serve as a primary point of contact with state government for forest products manufacturers, help direct companies to state resources, and help state agencies identify companies that may be facing challenges;
- Help business-assistance program in Maine state government reach out to forest industries, and when appropriate help business assistance programs design products that meet the forest industry's needs; and
- Provide outreach to Maine forest industries to let them know about changing market conditions, emerging opportunities, existing assistance programs, and other items of interest.

The home of this position must be carefully considered, as responsibilities would include both forest industry and economic development. A joint appointment to MFS and DECD, with the individual serving in both departments, is likely the best approach. Wherever this position is housed, great care must be taken to make certain that this position is viewed as professional and not political. The person in this position must have access to the leadership of all state agencies.

4. **Conduct a collaborative effort spearheaded by the forest products industry, state government and the University of Maine to help Maine citizens, legislators, opinion leaders and others understand the current state of the forest products industry, the challenges it faces, and the actions that might best improve the long-term prospects of the industry.**

Among opinion leaders and the general public in Maine, there is a lack of factual information on the state of and challenges facing forest products manufacturing in Maine. Clearly, the industry faces some very significant challenges, including the great increase in competition from around the globe. However, Maine's forest industry has been resilient and creative in the face of this competition, and many individual firms are well positioned for the future.

Maine state government (led by the individual noted in recommendation #3), industry experts at the University of Maine and the state's forest products manufacturers, most likely working through their trade association, could do a better job of helping others understand the entire situation in the forest products industry. An ongoing outreach campaign could include:

- An annual, publicly available "state of the industry" report card, highlighting successes, losses, opportunities and providing overall industry statistics;
- A concerted effort to help press outlets identify positive stories in the forest products industry. Maine media has not had trouble finding and covering high-profile negative stories in the forest industry (e.g. mill closures), but positive stories have not received a similar level of coverage;
- Information targeted at consumers regarding lands and mills certified under one of the forest certification programs in order to begin certified product consumer market pull from Maine consumers of forest products;
- A series of press or key contact tours at Maine forest product manufacturers to help legislators, state officials and business writers better understand the modern forest industry, its challenges and opportunities; and
- Regular and ongoing communication with opinion leaders, elected officials and state officials regarding the state of the industry, as differentiated from the state of a particular manufacturing facility.

The overall goal of such an effort is to create an educated understanding of the fact that Maine's forest industry faces real challenges, but has been taking steps to remain competitive. The goal of this effort would not be to encourage any particular action, but to help make certain that Maine citizens and opinion leaders are best informed regarding the state of this critical component of Maine's economy. More can be done to help the forest industry compete, and if citizens and policy makers understand this they are more likely to support taking such action. To the extent that Maine forest products industries can honestly project itself as an industry facing challenges *and* finding opportunities, they will be better positioned to work in partnership with others.

5. Create both the perception and reality of public policy consistency and predictability[232].

INRS' survey of Maine forest product manufacturers, as well as conversations with industry members, registered frustration with what is viewed as an unstable and unpredictable policy environment. As with some other issues raised by members of the forest products industry, this is difficult to measure.

State officials and legislators counter that in the absence of action, forest industries would not take action to address the issues that raise public concern. Legislators and regulators view it as their responsibility to address situations that they see as problematic. They view this as their responsibility as public servants, and cannot be expected to change. The Maine public has been and is particularly involved in forestry issues, and this too is unlikely to change.

Given this obvious and necessary tension, the challenge is how to create a public policy environment where regulatory action is not necessary because of voluntary industry action to address a problem; in instances where regulation is necessary, it should be viewed by industry as measured, reasonable and predictable. This does not mean standards should be rolled back; but

[232] This is also a recommendation of the Legislative Task Force to Increase Primary and Secondary Forest Product Manufacturing, May 1999.

it does mean that regulations should be evaluated to determine if they meet the goal as simply as possible. Both forest industry and state government are responsible for finding a workable solution to this issue.

The perception of a stable policy climate is an important part of securing investment in Maine's forest products manufacturing facilities. In their interviews with bankers and investors as part of this project, *Pan Atlantic Consultants* identified a stable policy climate as a way to encourage greater investment in Maine facilities. Similarly, INRS spoke with firms who had delayed investment in facilities because of concerns about potential or pending policy development.

Concrete steps can be taken that will send a message that Maine is interested in a stable policy environment while not sacrificing environmental quality, worker safety, or other legitimate public concerns:

- Regulators can share with the forest industry a multi-year "roadmap" that shows issues of growing concerns, and provide the industry an opportunity to provide suggestions and reactions to this roadmap – a measured and constructive reaction from the industry to this roadmap will be critical to its success;
- Forest products manufacturers can identify issues of concern to the public or regulators and work to implement non-regulatory solutions;
- Before initiating voluntary actions, all parties can clearly state what they view as success in quantifiable terms;
- Forest industry can identify specific regulations (or parts of regulations) that are in its view overly burdensome or do not meet the desired outcome as efficiently as possible, and suggest ways that the desired outcome can be better reached;
- Regulators and forest industry can prepare credible analyses of the economic impact of new regulations or regulatory changes, so that the impact on industries in a globally competitive marketplace can be anticipated.

Common to all of these steps is an effort to clearly communicate issues of concerns and desired outcomes before there is a significant demand for regulatory action. All parties bear the responsibility of working together toward addressing issues in a collaborative manner.

By taking these steps, Maine government, forest product manufacturers and other stakeholders will help stabilize what too many forest product manufacturers and the investment community view as a policy environment full of risk and uncertainty.

Invest in Technology

6. Increase efforts to move work conducted at Maine's world-class research and development facilities to commercial application in Maine.

Maine has state-of-the-art research facilities, most notably the *Advanced Engineered Wood Composite (AEWC) Center* and the *Pulp & Paper Process Development Center* at the University of Maine in Orono (UMO). These institutions operate with a variety of funding, most of it for contract research.

Much of the work conducted at these facilities is proprietary, with specific tasks completed for clients. This is important work, and provides the research facilities with money to operate, expand, and employ a core staff. These facilities, particularly the AEWC Center, also develop new technologies, processes or products that are not for specific clients. These represent opportunities to build new product lines or improve manufacturing processes for Maine industries.

To date, the AEWC center has enjoyed some success in moving new developments to the marketplace. However, there is clearly potential for more. AEWC has spun off technologies to Maine companies, including Correct Building Products and Engineered Materials of Maine. While EMM failed as a company, there is no indication that there was a problem with the technology.

In order to better move Maine-developed technologies to Maine companies, Maine should develop a mechanism to incent private sector individuals to connect technologies with companies in a position to commercialize them. This may require limited public funding to get off of the ground, but if private sector individuals were offered a fee – to be derived from licensing revenues – for locating companies to license AEWC-developed technologies, the Center could have an incentive-driven sales force at very modest up-front cost. Conversely, these private sector individuals will bring to AEWC companies interested in developing specific products to grow their existing businesses.

There may be an initial need to cover some up-front costs associated with developing product descriptions, preliminary business plans, and other marketing material. Once developed, the AEWC Center could provide this to any and all consultants – both private and public sector – and offer a standard "finder's fee" (likely as a percentage of licensing revenues) to companies or individuals who successfully bring them new customers. As the AEWC Center would receive no revenue if the technology were not licensed, this does not represent a new cost and instead should be simply viewed as a business-style way to market technology.

To accelerate the commercialization of AEWC-developed technologies, a complementary and important approach could be for the State to place one industrial development specialist within AEWC who would (a) develop the business plans for new technologies, (b) help identify private and public sector consultants that can commercialize these technologies, and (c) identify and interact with Maine companies who would like new products developed to expand their business. This individual could serve the same function for other UMO-based forest products research.

7. Promote research, development and commercialization of bio-based products, particularly those that are compatible with Maine's existing forest products manufacturing infrastructure.

A growing body of evidence suggests that a wide variety of products can be made from wood, including substitutes for a number of fuels and chemicals currently made from petroleum-based materials. While it is becoming apparent that these bio-products are likely feasible, much work

remains on how to extract these materials, and how to do so in a commercially viable manner. The economic feasibility of these products is more likely if oil prices increase.

Nationally, the paper industry has committed resources to researching bio-product development through the *Agenda 2020* program. In Maine, a number of institutions[233] have received federal funding to move bio-product development forward. This is positive, and Maine industry and state officials should support efforts to identify, research and deploy bio-product manufacturing processes.

Given Maine's existing paper industry, a logical place for state investment is in areas or products that will exist in connection with paper mills, not processes that will serve as competition. Research is ongoing in the Northeast to identify ways that bio-products can be extracted from wood products prior to pulping and from pulp mills sludge. These are obviously the type of products that – if economically viable – would enhance the position of Maine's existing forest products manufacturing infrastructure.

Given the presence of world-class research facilities – including a pilot paper machine – at the University of Maine, the state is well positioned to become a research leader in this area. As bio-products move from the research phase to development, it may be necessary to identify small, nimble companies that are willing to take these products to the commercial level with an "over the fence" relationship with existing mills, where a bio-product developer has a contractual relationship with a pulp or paper mill, but operates an independent business.

While this is an area of potentially great promise, it must be considered that significant technical and economic barriers exist before a large number of bio-products make their way to the marketplace. It will take time, money, and a number of pilot projects to implement bio-product development in Maine. These are important, and should be supported. However, a healthy recognition that bio-products are not an immediate or entire panacea for Maine's forest products manufacturing sector will serve all parties.

8. Expose Maine forest product manufacturers to the latest technologies

In today's globally competitive environment, it is clear that continued investment in technology is one component of success for Maine forest product manufacturers. For larger Maine companies, and particularly for companies with facilities in multiple states or countries, finding technologies that improve productivity or other aspects of the business does not seem to be an issue. However, for smaller mills, or mills that don't have staff or resources to spend on such research, identifying technologies that will improve their performance can be a challenge.

While vendors do visit potential clients in Maine, we must recognize that Maine does not have the mill concentration of the U.S. South or Pacific Northwest, and as such does not receive the same level of attention from vendors. Maine mills do benefit when vendors are visiting Eastern Canada, as they can easily reach customers and potential customers in Maine. Getting these

[233] These institutions include the University of Maine, the River Valley Growth Council, and the Maine Technology Institute.

vendors -- and vendors of cutting-edge technologies not currently targeting Maine -- to connect with existing industries would provide an opportunity for smaller mills to learn about and make informed decisions about investment in new technologies.

There are a number of ways that this might be done, with minimal cost to either existing forest industries or the state:

- If an entrepreneurial network developed (see recommendation #11), this would provide a great opportunity to invite a vendor or vendors to some meetings, as vendors would save expenses by presenting to a large number of potential clients at one time;
- Using existing state personnel or an individual dedicated to forest products manufacturing (see recommendation #3), publish and electronically distribute a regular (perhaps quarterly) summary of new technologies available in the marketplace. These would *not* be advertisements, but would be brief summaries of new technologies available and contact information for companies to get more information;
- Request and make available programs from major forest industry trade shows, so that industries can identify potential equipment manufacturers and conduct follow-up research, and recognize the opportunities that attendance at these shows represents;

This is an area where State – most likely through the Maine Forest Service -- or industry group action must lead; it is not reasonable to expect that companies that spend resources of staff time and money to attend trade shows or otherwise research technology innovations will share this information with potential competitors.

9. If Maine pursues an aggressive renewable portfolio standard to encourage development of renewable energy, biomass power that meets certain emissions standards should be included.

As discussed in the section on biomass energy, renewable portfolio standards (RPS) are used in a number of states to encourage renewable energy, including biomass energy. RPSs are used to provide a market exclusive to renewable power generators, and have been successful in providing incentives for new investments in renewable energy facilities. RPSs are being used in a number of area -- including Massachusetts, Connecticut and Rhode Island in the New England region – to provide meaningful, market-based incentives to renewable energy generators and encourage biomass energy facilities to address emissions issues. Some Maine biomass facilities that are investing in their operations are now able to participate in these regional markets.

RPS provide a number of public benefits, including incentives for low emission electricity, funding for new or existing renewable energy producers to use the latest technology, and fuel diversification that can have a stabilizing impact on electricity prices.

The continued operation – at some level – of biomass energy facilities is important to the forest products industry. They provide an important market for low-grade wood and a critical disposal option for sawmill residue, and have become an important part of Maine's integrated forest products cluster. At the same time, it must be noted that effective RPSs, by their very nature,

create a price premium for renewable power, which is passed on to customers. The amount of the price premium, and its duration, would depend largely upon the design of the RPS and the marketplace reaction to it.

If Maine elects to pursue a new RPS, it should include biomass power. If a high-value tier is established, Maine should adopt an emissions-based standard for biomass power similar to Connecticut's, that encourages existing biomass electricity facilities to invest in new combustion or emissions control technology. This would provide an opportunity for new or existing biomass facilities that met a strict emissions standard (the Connecticut biomass standard for participation in the Class 1 RPS is 0.075 pounds of NOx per MMbtu) and compete with other renewables, presumably wind power, landfill gas, solar, wave and perhaps some types of hydroelectric generation.

Inclusion of biomass in this standard has multiple benefits. This provides an incentive for new or existing biomass, and allows a continued market for both low-grade wood and sawmill residue. Equally important, it potentially increases the available supply of power that can potentially participate in an RPS, and over time will drive down the cost of compliance with RPS regulations. This is important for all ratepayers, including forest industries, as the larger the available supply, the lower the cost of compliance.

Similarly, if Maine adopts an aggressive RPS, provisions should be made to make certain that Maine facilities that self-generate power and meet the prevailing emissions (or other) standard(s) are allowed to participate in the RPS and enjoy the same financial incentives.

Develop Entrepreneurial Talent in the Industry

10. Form a public – private partnership to encourage shared training, creative thinking, business development and improved operations management for sawmills and wood product manufacturers.

A fundamental need in any manufacturing industry is qualified labor. In our survey of forest products manufacturers, a number expressed difficulty finding skilled employees, both today and in the future. On further discussion with industry leaders, many expressed frustration finding basic labor, and indicated that if they could offer better pay this issue would likely correct itself. INRS believes that recommendations that address other costs associated with forest product manufacturing are the best way to address this issue. Similarly, industry leaders indicated that they had particular, specialized needs – for example an individual that can operate a machine used in only one or two New England facilities – but indicated that on-the-job or vendor-sponsored training was the best way to address these needs.

The one area where a number of industry leaders expressed real concern about the future of Maine's forest products industry – particularly for sawmills and wood product manufacturers – is in the business leadership skills of the "next generation". Many in the industry do not see a pool of young individuals with the creativity, training, experience and drive necessary to make forest products manufacturing a thriving industry going forward. There are certainly exceptions to this

observation, but INRS heard the concern frequently enough that we feel the need to address the issue.

INRS proposes that Maine, with the cooperation of other New England states if possible, develop a *Wood Products Institute*, where individuals involved in or studying to be involved in the manufacturing side of the forest products industry could receive high-level continuing education. This would *not* be a college curriculum, but an on-going series of continuing education opportunities that would address everything from mill management, yield improvement and wood-buying strategies to funding opportunities and global market dynamics. The curriculum could continually evolve to meet the needs of participants, and would be best presented in small modules that working professionals could participate in. While aimed at those already in the industry, making this opportunity available to students studying forestry or engineering would provide great long-term benefits to the industry.

In order to get off of the ground, this *Wood Products Institute* would need to have funding and staffing secured largely with public funds. Industry participation in the development of the preliminary curriculum would be necessary to assure that the program met their needs for participation, and industry funding could be expected through tuition payments and eventually donations.

The administrative location of this entity should be carefully considered, with a preference toward institutions that have an educational mission. The University of Maine may be the best positioned to host such an effort because they have existing staff and facilities and a strong entrepreneurial program; other likely possibilities include the community college system, forest industry trade associations, the regional North East State Foresters Association, or quasi-state agencies such as the Manufacturing Extension Partnership or the Maine Technology Institute.

11. Forest product manufacturers or industry sectors should work together to develop entrepreneurial networks, share information, and learn about emerging opportunities.

Many people from the forest products industry (both large and small companies) we spoke to as part of this research indicated that they seek information on a wide variety of topics, including anticipated changes in the marketplace, programs available to assist Maine industries, marketing of Maine forest products, and opportunities in the developing renewable energy marketplace.

It appears that there is an opportunity for Maine forest industries to create a forum – either within or external to existing trade associations – that could bring this information to industry leaders. If a forum like this is to start, it must come from within the industry, and it must meet the needs identified by Maine forest industries[234]. It should *not* seek to replicate or replace the existing advocacy function played by Maine's forest industry trade associations, but should instead focus on the non-advocacy needs of forest industries that are best developed through information sharing and network development.

[234] It should be noted that Maine forest industries have some of this in place currently, including programs by trade associations or university foundations. However, these programs have clearly not fully met the needs of Maine forest industries, and may benefit by advertising to and welcoming attendance by those outside the membership of the organization.

A good example of such an organization in Maine is the Environment & Energy Technology Council of Maine (E2 Tech Council). This organization is focused on the "creation of a communication, networking and information infrastructure that creates business development opportunities, provides technical assistance and increases knowledge regarding innovation." Some Maine forest industries may benefit from participation in this organization or some of its events[235], and this organization may serve as a model for Maine product manufacturers seeking to learn about and share new ideas.

It must be noted that such a forum, like all trade groups, must be careful not to engage in any activity that would violate anti-trust laws. This includes any activities that would have potential competitors directly address or discuss prices (including bids), costs, production capacities, credit standards, marketing strategies, market shares, customer or supplier classification, sales territories, sales policies, or any other matters covered by State or Federal antitrust laws.

The sharing of success stories is also a critical part of developing an entrepreneurial culture, where firms publicly highlight their successful adoption of new ideas and business practices. This practice runs largely counter to the existing culture of Maine's forest industry, where innovations are kept close to the vest, and information sharing is often discouraged. Maine industries should work to identify what success stories can be shared, and find ways to do so. This has a number of benefits, including idea sharing within the industry and building of public confidence in the creative aspects of Maine's forest industry.

12. Develop a one-day annual meeting and trade show for micro-businesses engaged in forest product manufacturing.

Maine has a significant number of micro-businesses (fewer than ten employees) engaged in forest products manufacturing, and there is opportunity for this sub-sector to grow. The survey of micro-businesses showed that the concerns of this sector are quite similar to concerns of larger businesses. Therefore, many of the recommendations contained in this report will benefit Maine micro-businesses.

However, it is clear that micro-businesses face challenges in ways that larger businesses do not. Often a micro-business has one individual that is responsible for all aspects of the operation – production, accounting, marketing, product development, inventory management, and all other aspects of the operation. Many of these firms start as second jobs or retirement careers, grow out of hobbies, or are the product of a desire to be one's own boss. All too often, these businesses lack a sound business and financial plan, an area for improvement.

The State of Maine, working with private sector partners, should initiate an annual conference to address issues important to forest industry micro-businesses in Maine. A one-day workshop that offered opportunities to learn about success stories, issues such as marketing or tax law, and connected micro-businesses to existing business assistance programs would provide these

[235] It should be noted that most E2 Tech Council Events are based in Portland, and as such may not be readily accessible to many forest product manufacturers.

entrepreneurs an opportunity to learn about growing their business, either in number of employees or volume of business.

Because a comprehensive association that represents micro-businesses in Maine does not currently exist, the state would need to initiate action to make this event a reality. However, existing private-sector partners such as Maine WoodNet and the Maine Wood Products Association should be involved in the planning and implementation of the conference; the goal should be to hand the annual event over to the private sector as quickly as is practical. One outcome of such an event may be the beginning of an association that works on issues critical to Maine's forest-based micro-businesses.

In scheduling such an event, organizers should take care to recognize that time away from a business is costly for small operations, and strive to have a meaningful event that considers the work schedule of many micro-businesses. A weekend day during a non-tourist season may be most appropriate.

Distinguish Maine Products in the Marketplace

13. Develop a marketing campaign that highlights the environmental and other benefits of Maine forest products, and use this to help distinguish Maine products in a global marketplace.

Maine and its forest products manufacturers should seek to leverage the state's position as an environmental leader to market the state's forest products. Maine is currently well positioned to use its position as a leader in forest certification to brand Maine forest products and distinguish them in the eyes of consumers.

The Maine Forest Service has taken the lead on this and should continue working with its partners. Efforts should be made, both through the state budget and grant sources, to continue the staffing and momentum of this effort.

Maine has made a decision to aggressively pursue forest certification, with a goal of certifying 10 million acres by the end of 2007. This is laudable, and can be best realized in conjunction with a campaign that promotes consumer recognition of this effort. By seeking to develop customer demand, Maine can help support and provide incentives to forest landowners. At the same time, Maine can build an identity for Maine forest products that builds upon the perception of Maine products as environmentally superior.

This will require a multi-tiered approach, recognizing that Maine forest products go to a variety of customers:

- For consumer-ready products such as furniture, flooring and some turned products, the *Maine Made* program already exists, and is popular with many forest product manufacturers. As this is an existing and accepted program, it should not be replaced. However, it may be appropriate to add a component specific to forest products that

educates consumers about the quality of forest management in Maine and the benefits of using Maine-manufactured wood products;

- For industrial products, such as lumber, Maine can emphasize both the physical characteristics of Maine forest products as well as the environmental aspects. Because industrial products are not generally sold to the final consumer, the opportunity to leverage the "story" behind Maine forest products is less than for consumer-ready products, and should be only a part of the focus;
- For paper, a small but growing number of major consumers are considering the environmental attributes as one criterion they consider when make purchasing decisions. Maine has been a leader in capturing and promoting this opportunity, and efforts should be continued.

Because the bulk of Maine's forest products are sold as commodities, it is unrealistic to develop a campaign that is wholly "final consumer" focused. *Maine Made* targets the final consumer, and does so well. Instead of developing a marketing program to replace this, Maine state government and forest product manufacturers should develop a compatible program that emphasizes the responsible management of Maine forests as well as the quality of the product and the "story" behind them[236]. While individual firms may wish to pursue marketing tied to specific certification programs, any Maine program should instead promote certification as one piece of the benefits of Maine forest products.

As progress is made on this recommendation, Maine may wish to work with others in the region, particularly the Northern Forest states of New Hampshire, Vermont and New York on a regional initiative. Given Maine's leadership role in certification, this should be carefully considered, but there are examples of very successful regional branding campaigns[237] that Maine may wish to consider.

Once a branding and marketing campaign is developed, both the state and the industry must be willing to promote it in global markets through advertising, trade show presence, web presence, use on products and other forms.

<u>Improve the Ability of Maine Forest Product Manufacturers to Compete</u>

14. Improve the connections of existing state business assistance and business development programs to forest product manufacturers, and have the forest industry evaluate existing programs and offer suggestions on how existing programs might better meet the needs of forest product manufacturers.[238]

Maine has a number of state, quasi-state and state-funded programs that are available to businesses. These programs cover a wide variety of areas, and include energy conservation,

[236] Examples of what may be the "story" of Maine forest products include the quality of its workers, a Yankee ethic, tradition and longevity in the industry, and forests that provide a variety of public benefits.
[237] For example, the Appalachian Hardwood Council and the Southern Pine Council's regional promotional efforts.
[238] This is similar to a recommendation of the Legislative Task Force to Increase Primary and Secondary Forest Product Manufacturing, May 1999.

business management assistance, entrepreneurial development, and funding for technology deployment.

As a whole, these programs appear to be poorly connected to Maine's forest product manufacturers. In a survey of industry members, *at least* seventy percent of respondents did not know of, or had only heard of, a sampling of four Maine programs. While this was only a sampling of some of the opportunities available to Maine forest industries, there is no reason to believe that other programs have higher recognition. Similarly, most of the forest industries surveyed did not know if these programs met their needs.

It is clear that existing programs are not as well connected to Maine's forest industries as they could be. Given the wide array of opportunities and services available to Maine forest industries, this connection should be strengthened. This is the responsibility of both state programs and the forest industry.

State programs should work together to host a series of "opportunity fairs" around the state, where forest products companies (and perhaps others) are invited to learn about existing programs, receive information on how to participate, and develop contacts. It will take a concerted effort to get forest industries to attend such an event. For this reason, travel distance should be minimized by hosting a series of similar events around the state, and organizers should partner with trade associations in order to make these events as well attended as possible.

Forest product manufacturers, acting individually or through trade associations[239], should review existing business assistance programs and – within the mission and funding of each program – offer clear suggestions on how products might better meet the needs of existing and new forest products companies.

It is likely that one of the reasons that business assistance programs are not well known to forest products companies is that there is a large array of such opportunities, and many businesses do not have the time or staff to search out these opportunities. Forest industry associations, acting in partnership with the state, would do their members a significant service by putting together a *brief* summary of programs available and necessary contact information. Inviting state program staff to key association meetings on an ongoing basis could result in the program recognition needed to assure program acceptance by industry. Similarly, using newsletters or other communication vehicles to highlight programs could help connect forest product companies with existing programs.

15. Create a "Maine Manufacturing Competitiveness Fund", a revolving fund that provides manufacturers with capital to make capital investments in energy efficiency.

Maine forest industries have made commitments to energy conservation – doing so only makes economic sense given the state's and the region's electricity costs. Energy conservation is a way to control energy costs, a significant input cost for many mills.

[239] Depending upon the programs, this refers largely to the Maine Forest Products Council, the Maine Wood Products Association, and the Maine Pulp & Paper Association.

Through this project INRS has spoken to a number of forest product manufacturers that recognize that they can do more to conserve energy in their manufacturing process, and many know exactly what actions need to be taken to secure energy savings. However, energy conservation projects require capital, and compete directly with other capital needs. Because other investments may improve productivity and have shorter payback periods, worthy energy conservation projects often go unfunded. Maine does have a systems benefits charge-funded energy conservation program, *Efficiency Maine*, but a price cap of up to $50,000 per company per year limits its effectiveness for major industrial projects.

If Maine manufacturers, including forest products companies, had access to a pool of money made available specifically for large energy conservation projects, many would pursue these activities, and improve their long-term competitive position.

Maine should develop a revolving fund earmarked specifically for energy conservation projects at Maine manufacturing sites, using the following method:

- Capitalize the fund through a one-time allocation from state appropriations or a bond issue;
- Have companies voluntarily identify energy conservation projects that they seek funding for, and require a modest match from the participating company;
- Structure the public money used in the project as a loan, with payments equivalent to the calculated electricity cost savings of the participant (this assures that participating facilities will be "revenue neutral" during their payback period);
- Make the interest rate equivalent to the consumer price index (so that the working value of the fund does not diminish over time);
- Consider the loan paid for once the cost of the energy conservation project is repaid, plus interest and administrative cost;
- Once the loan is paid, the participating company would be able to enjoy the energy costs savings and the public will benefit because of reduced electricity demand and associated emissions reductions;

This model provides a framework for Maine to encourage manufacturers to make greater investments in energy efficiency, benefiting both the manufacturer and the public. A one-time capital expenditure would be required, but following this the fund could be structured to run without new inputs of public money, thus providing ongoing benefits without ongoing costs.

16. Adopt a "Manufacturing Energy Policy"

Electricity costs are high for grid-based purchasers of electricity in Maine and throughout New England. Even for companies that self-generate electricity, this option represents a commitment of capital that could otherwise be put to other uses.

Electricity in Maine and New England is expensive when compared to other regions for several reasons: distance from coal, oil and natural gas reserves; historic decisions ("stranded costs")

that have proved expensive and are being paid off through transmission and distribution charges; long, cold winters that require generating capacity not in constant use during other seasons; and other factors.

Some of these factors (such as "stranded costs") will diminish over time; others are unlikely to change. Given this, it will take a commitment on the part of Maine government to help move Maine forest product manufacturers (and other manufacturers) closer to a U.S. average cost for industrial electricity.

Maine is a net exporter of goods; manufacturing is one way that the state earns its wealth. Given Maine's role as an exporter, it is only logical that Maine should seek to make manufacturing costs as reasonable as possible. Maine should formally adopt a Manufacturing Energy Policy that includes the following:

1. An acknowledgement of the importance of energy costs to manufacturers;
2. A commitment on the part of the Public Utilities Commission to expressly consider the impact of all decisions on manufacturers;
3. A clear "right to self-generate", including backup and other rates based upon probability of need.

A policy of this nature will not solve the issue of higher than average electricity rates for Maine manufacturers; yet it is a clear and tangible step in that direction. More than anything else, this would set the atmosphere where Maine industries know that that Maine recognizes the impact of electricity rates upon manufacturers and will carefully consider this issue when moving forward on any electric industry policies.

17. Continue to support the Maine Congressional Delegation's effort to obtain a Congressional federal weight limit exemption for Maine's currently non-exempt Interstate highways.

Weight restrictions on the interstate highway system in Maine have a significant impact on Maine forest product manufacturers. As noted in a recent report to the Maine Department of Transportation, Canada allows significantly higher truck weight limits than Maine[240], and "U.S. companies competing against cross-border rivals in natural-resource-based industries, where profit margins are typically low find it difficult to compete against foreign competition that is able to use more efficient means of transportation."[241]

Currently, trucks weighing up to 100,000 pounds gross vehicle weight are allowed to travel on state roads and the Maine Turnpike System (I-95 from Kittery to Augusta); the remainder of the Interstate Highway System in Maine has a federal truck gross vehicle weight limit of 80,000 pounds. This causes trucks to have to take one of several options, none of them desirable:

[240] In Canada, the largest allowable gross weight limit is 138,000 pounds.
[241] Wilbur Smith Associates, Woodrooffe and Associates, B.T. Harder, Inc. *Executive Summary: Study of Impacts Caused by Exempting Currently Non-Exempt Maine Interstate Highways From Federal Truck Weight Limits.* June 2004.

- Use roads that are not as fast or efficient as the Interstate Highway System, and travel through town centers, populated areas and business districts;
- Carry a lower weight in the truck, thus increasing transportation costs; or
- Violate the law and haul above-legal limits, in hopes of not getting caught.

Maine industries, the Maine Department of Transportation, the state's congressional delegation and others have long sought federal legislation that would allow the higher state truck weight limit on currently non-exempt Maine Interstate highways. A recent independent analysis commissioned by the Maine Department of Transportation indicated that increasing the allowable weight limits on the currently non-exempt Maine Interstate Highway System to the state weight limit would increase safety, reduce highway maintenance costs, reduce bridge maintenance costs, and increase toll revenue. The analysis indicates that the "economic benefit to Maine resulting from exempting currently non-exempt interstate highways in Maine from federal truck weight limits is an estimated $1.7 to $2.3 million per year."[242]

Maine forest industries should continue to press the federal government for weight limits of 100,000 pounds for Maine's entire Interstate highway. This would be a significant benefit to Maine forest product manufacturers, and help reduce high freight costs associated with truck transportation.

In this same regard, Maine forest industries should identify cases where allowing short hauls of heavy material would make a significant economic difference to a manufacturer and ask for assistance from the Maine DOT. Examples would include manufacturing facilities located close to the Canadian border, near but not on Maine's private road network, or where a supplier is located in close proximity to a mill. The Maine DOT has demonstrated that when the road network will allow heavy traffic for short distances on designated routes they are willing to work with companies.

18. Work with the Maine Department of Transportation to implement recommendations in their Integrated Freight Plan.

In 2002, the Maine Department of Transportation (MDOT) released an Integrated Freight Plan that addressed freight transportation issues for both trucking and rail. The final report offers near-term and long-term recommendations on a variety of issues important to forest products manufacturers in Maine, including:

- A process to work with industry to identify "quick-fix" projects;
- Development of infrastructure to encourage safe and efficient transportation of freight;
- Improvement of inter-modal connections in Maine;
- Recommendations to address needs at the state's ports;
- Development of a strategy for public investment in rail infrastructure;
- Addressing both truck weight and trailer size restrictions currently in place; and

[242] Wilbur Smith Associates, Woodrooffe and Associates, B.T. Harder, Inc. *Executive Summary: Study of Impacts Caused by Exempting Currently Non-Exempt Maine Interstate Highways From Federal Truck Weight Limits.* June 2004.

- Investigating the use of internet-based load matching technologies to lower overall freight costs for Maine manufacturers.

MDOT is working to implement the recommendations of this plan, and will be reviewing progress in coming years. While not written specifically for Maine forest product manufacturers, this plan addresses a wide variety of issues important to Maine's forest industry. Rather than beginning a new process, Maine forest product manufacturers and state officials concerned about forest products manufacturing should become familiar with the existing Integrated Freight Plan, share thoughts with MDOT on how it might be modified to better fit the needs of forest product manufacturers, and work toward implementation of recommendations contained in this plan.

19. Continue state efforts to address challenges in Maine's business climate.

Maine has a business climate that many forest product manufacturers find challenging. The state recognizes this, and in some cases has taken concrete steps to address issues. A number of forest product manufacturers we spoke to commented on progress in two areas in particular:

- **Environmental Permitting** – Maine forest industries have long expressed frustration with the pace and cost of getting a new facility (or changes to an existing facility) permitted. However, through conversations with both regulators at the Department of Environmental Protection (DEP) and with recent permit applicants, it appears that this issue is being addressed. Both regulators and permit applicants report a process that is fair, predictable and efficient. INRS notes that this is an apparently recent development, and that many forest product manufacturers have described past experiences that did not appear to meet this standard. The forest products industry and DEP should monitor the speed and predictability of the permit process, and demand a high level of performance. In today's fast-paced business environment, the ability to quickly deploy new technologies is critical to business success; DEP is to be commended for recognizing this in recent actions.

- **Health Care** – The cost of health care is cited by many forest products manufacturers as an additional cost of doing business in Maine. Maine has an aging population and a widely distributed health care delivery system (due to the rural nature of the state); both of these issues tend to raise health care costs. Maine small businesses saw health care premiums rise 58% in the five-year period from 1996 and 2001[243]. Maine has created an innovative new approach to providing insurance *and* containing costs, Governor Baldacci's *Dirigo Health Program*. Depending upon how an industry currently provides health care, this impacts forest products manufacturers differently. Further, the program is just beginning to take enrollees as this report goes to press, so it is clearly too early to determine its success in addressing rising health care costs. However, *if* over the long term this program is successful in stabilizing health care costs for Maine businesses, it will be a benefit to Maine's forest industry.

[243] http://www.dirigohealth.maine.gov/ accessed October 3, 2004.

Other areas where progress has not been as visible are addressed elsewhere in these recommendations. However, when the state takes action to address challenges it is critical that Maine forest products manufacturers and state officials charged with development of the forest products industry recognize and encourage these efforts. Maine forest product manufacturers should monitor progress on these issues, encourage continued efforts, participate where appropriate, and offer suggestions for improvement when identified.

Recommendations from Elsewhere in the Maine Future Forest Economy Project

Throughout this report, a number of recommendations have been offered that may help position Maine's forest products industry for the future. Without detailing each recommendation, the following are brief summaries, along with information on where to reference them. Some of these recommendations are by parties who made independent recommendations as part of this project and are not necessarily supported by Innovative Natural Resource Solutions LLC.

Survey Responses

Many of the responses to the open-ended survey questions by Maine forest industries (pages 196 - 208) and micro-businesses (226 - 230) can be considered recommendations, and are not reprinted here due to length.

Role of Certification, page 261 - 269

20. State government in Maine needs to get very serious about its interest in being a certified product consuming market leader. Very specific certified product purchasing targets must be set and met beginning immediately.

21. Maine certified companies must pressure the certification programs (chiefly the Forest Stewardship Council and Sustainable Forestry Initiative) to invest in serious marketing of these programs and their brands to the consuming public.

22. Maine state government should develop its own marketing initiative to reach consumers in Maine and surrounding states and provinces, at least.

23. Maine state government should continue to work with entities involved in the certification of small acreage lands (family forest owners) but should act as facilitator only in order to keep the certification programs private and market driven.

24. The private sector needs to increase the number of mills that are certified under the various certification programs because in order to get certified forest products from the woods to the marketplace, certified mills are an essential pass-through point.

Branding Maine Forest Products, by *Dr. Robert Bush*, pages 283 - 290

25. Maintain the existing Maine Made program; maintain and possibly sharpen its focus on consumer goods.

26. Focus a new program on the segments of the solid wood industry that produce industrial goods.

27. Consider a regional branding/promotion strategy, rather than a state specific program.

28. Use environmental certification as a part of the brand image to be developed but do not align the program with a specific certification approach or program.

29. Brand development and image building should be facilitated with a promotion program that includes sales promotion (e.g., trade shows) publicity and advertising.

Maine Forest Resources, by *Maine Forest Service / Department of Conservation*, page 291 - 307

30. Continue to provide timely analysis and trend assessment:
    - The current USDA FIA annualized inventory, being implemented with the cooperation of the Maine Forest Service, must be maintained on its current 5-year cycle of panels
    - The Maine Forest Service needs continued support and funding for data collection, analysis, and timely reporting.

31. Provide tools for informed changes in the forest management of Maine's extensive resources:
    - A new and enhanced timber supply analysis is needed using the complete set of 5-year inventory data. The time is ripe for the Maine Forest Service and other partners to initiate and complete a new and enhanced timber supply analysis. Tools now exist that allow more detailed modeling of species, products, and silvicultural practices and the production of an optimized result, which can also incorporate ecological considerations. This will require staff dedicated to running, developing, and maintaining these complex models.

Interviews with Investors and Financial Professionals by *Pan Atlantic Consultants*, Pages 308 - 342

32. Follow through with the Governor's plan to eliminate personal property taxes on business equipment.

33. Review the concept of an additional tax credit for new technology development and sharing.

34. Develop a state-level business development action plan to provide industry support for each component of the forest products sector.

35. Support federal efforts that level the playing field with foreign competitors, including the use of countervailing tariffs and similar measures.

36. Develop an industry-sponsored awareness and brand positioning campaign to educate Maine citizens on the importance of the industry to the state's economy – similar to the American Beef Producers' "Beef. It's What's for Dinner."

37. Ensure Maine state government support for actions that support market development and technology transfer for Maine forest product manufacturers.

38. Support, strengthen and develop industry training programs.

Driving Forces, Niches, and Private/Government Priority Actions, by *Lloyd C. Irland*, Pages 390 - 406

39. Recognize the maturity of the forest products sector.

40. Retain working forests.

41. Support – moral and real – for intensive management.

42. Encourage forest certification and green building efforts.

43. Encourage demand for certified and other "green" products through state purchasing policies.

44. Provide support for the wood energy sector.

The Outlook for Maine's Forestry and Forest Products Sector – Trends and Possible Strategies for Positively Shaping the Future by *Jim L. Bowyer*, Pages 407 - 422

45. Develop a mass-customization business model.

46. Develop a network of bio-refineries.

47. Develop a global housing / innovation complex.

48. Position Maine as a source of environmentally preferable products.

49. Establish a U.S. / Canadian wood products enterprise zone.

APPENDICES

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Appendix A

Summary of Maine Future Forest Economy Project

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Maine Future Forest Economy Project

The Maine Future Forest Economy Project -- funded by the Maine Forest Service, Department of Conservation (through a USDA Forest Service grant), and the Maine Technology Institute – will assess the opportunities and challenges facing Maine's wood using industries, and identify ways that Maine forest industries can grow and prosper over the next twenty years.

The Maine Future Forest Economy Project consists of two main components:

1. A detailed, sector-by-sector analysis of the opportunities and prospects for Maine's wood-using industries, and

2. An action plan that identifies concrete, realistic steps to support and develop Maine's wood-using industries.

In preparing this work, the Innovative Natural Resource Solutions LLC (INRS) team will examine all manufacturing sectors of Maine's forest industry – pulp & paper, sawmills, engineered wood, biomass energy, bio-products, and secondary wood products.

INRS is pleased to be conducting this important work for the State of Maine, and will be surveying and meeting with a large number of Maine forest industries. In addition to conducting research on the challenges and opportunities Maine forest industries face, INRS will be meeting with state and national trade association leaders, owners and managers of Maine forest industries, customers of Maine's forest industries, and equipment manufacturers. By combining data-based research with the experience of leaders in the state's forest industry, INRS will be able to best understand where Maine industry and policy leaders can make changes to support a stronger forest industry.

If you have any questions on this project, please contact INRS at the above address, or email INRS Vice-President Eric Kingsley at kingsley@inrsllc.com

Appendix B

ESSAYS ON MAINE'S FOREST PRODUCTS INDUSTRY AND IT'S PLACE IN THE GLOBAL MARKETPLACE

ESSAYS BY LLOYD IRLAND AND JIM BOWYER
REACTIONS BY LLOYD IRLAND, JIM BOWYER AND AL SCHULER

Essays on Maine's Forest Products Industry and It's Place in the Global Marketplace

As part of the Maine Future Forest Economy Project and at the request of the Maine Forest Service - Department of Conservation, Innovative Natural Resource Solutions LLC (INRS) solicited essays from leading thinkers in the forest products industry on Maine's future role in a globally competitive industry. Specifically, authors were asked to address four questions:

1. What are the major forces currently influencing the global forest products industry and investments in new mills of upgrades to existing mills?
2. What are the emerging factors that are not apparent now, but will be in the future?
3. What will Maine's niche in the global forest products industry be in the future in light of these forces?
4. How can the forest products industry in Maine, and Maine government, best leverage Maine's unique niche to maximize value and "staying power" in both the near- and long-term?

Authors were asked to provide a high-level perspective and creative thinking, not necessarily new research. Following completion of these papers, each author was asked to pen a brief reaction to the other paper. These essays add an outside perspective to the Maine Future Forest Economy Project.

The valuable perspectives provided in this section are the opinions of the authors, and do not necessarily represent the opinion or perspective of Innovative Natural Resource Solutions LLC, the Maine Department of Conservation, or the Maine Technology Institute.

Authors who provided essays as part of this effort are:

- **Lloyd C. Irland,** President of The Irland Group. Well known to forest industry and government in Maine, Lloyd Irland has served Maine in a variety of capacities. A forester who served as both the Director of Public Lands and as State Economist, Irland has unique perspective on Maine's forest industry. Since 1987, Irland has served as a consultant working on forest industry issues for industry, trade associations, government and conservation organizations. He is presently serving as a Lecturer and Senior Research Scientist at the Yale School of Forestry & Environmental Studies.

- **Dr. Jim Bowyer** is a professor (part time) within the University of Minnesota's Department of Bio-based Products. He is an elected fellow of the International Academy of Wood Science, chairman of the Tropical Forest Foundation, chairman of the Minnesota Bio-fiber Council, a scientific advisor to the Temperate Forest Foundation, and an associate in Dovetail Partners, Inc. – a business-oriented environmental consulting firm. Bowyer has served as president of the Forest Products Society (1993-94) and of the Society of Wood Science and

Technology (1987-88), and as Vice President of the Consortium for Research on Renewable Industrial Materials (1992-2003). He was head of the University of Minnesota's Department of Wood & Paper Science from 1984 to 1994, and founder and director of the Forest Products Management Development Institute at the University of Minnesota (an organization dedicated to education and development of industry professionals) from 1994-2003. Bowyer served as project leader of the Minnesota Agricultural Experiment Station project "Environmental Life Cycle Assessment of Bio-Based Materials and Products" from 1988 to 2003, and led a research team focused on global raw material consumption and supply trends over a 30-year period.

In addition to these authors, Al Schuler of the USDA Forest Service was asked to provide a reaction to these essays.

- **Al Schuler** is a Research Economist with the USDA Forest Service. In this capacity, he is responsible for assessing the demand/supply situation for solid wood products and estimating the demand for engineered wood products (EWP). He also assesses the links between the softwood and hardwood forest products industry. Prior to joining the USDA Forest Service in 1999, Schuler was the Manager of Economics and Market Planning for Norbord Industries. There he developed Norbord's economic outlook (demand/supply analysis, timber supply assessment and price forecasting), provided forecasting services and supported the development of Norbord's overall business and market planning activities, which included strategic planning initiatives. Schuler's experience includes working as the Manager of Market Research for Forintek Canada Corporation, Research Economist for the U.S. Forest Service, as an Inventory Forester for the Washington State Department of Natural Resources.

Maine's Future Forest Economy:
Driving Forces, Niches, and Private/Government Priority Actions

By

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This paper offers an overview of major current and emerging driving forces affecting the Maine forest industry sector. It seems useful to separate emerging forces into two future time windows: near term (5-10 years) and long-term (20-30 years). Next, I identify some niches that appear to hold promise for Maine producers. Finally, I suggest some areas of public and private initiative that would assist the Maine industry in adapting to challenges and seizing opportunities.

This paper is an essay stating points in highly compact and conclusory terms. To explain causes fully, document them with charts, and discuss varying views on all these topics is beyond the scope of this work.

A number of important cyclical uncertainties, such as the outlook for the housing bubble, the near-term GDP and housing outlook, and the likelihood of another Asia Flu outbreak, are beyond my expertise and cannot in any case be fully treated in this short essay.

We open with some facts that illustrate the challenges being faced by the entire North American forest-based industry:

- The largest single line hardwood pulp mill in the world will soon be commissioned in Brazil by Veracel.
- No greenfield paper mill has been built in the US since the late 1980's.
- No greenfield mill has been built in Maine since SD Warren commissioned Somerset, in about 1980.
- No new paper machine has been built in Maine since the mid 1980's (also at Somerset)
- One of the largest Uncoated Free Sheet machines in the world is to begin operation in 2005 – in China.
- There are orders for specialized paper grades going to Europe because no US mill will (or can) make the product.

- The largest sawmill in North America is at Houston, BC, sawing 600 million board feet (MMbf) per year. Others in North America approach 400-500 MMbf per year. Large mills in Europe exceed 400 MMbf.

- The Houston mill's annual output is huge -- two such mills could theoretically produce Maine's entire annual production of lumber.

- I can't remember the last greenfield softwood sawmill built in Maine. (Can you?)

- The US is buying 900 MMbf of softwood, mostly construction grades, from Europe and Scandinavia (Irland, 2004). This is about equal to Maine's total spruce-fir lumber output. Quality is a key reason. The exchange rate is significant, but how much this trade flow will be affected by a weaker dollar is uncertain.

- New OSB plants are running 600 million sq ft and more per year. The Maine mills are in the 300 MM sq ft range and were built in the original wave of OSB plants in the North.

A. Current Driving Forces

MACRO ECONOMIC FACTORS

Four macro variables have been at work. They have been cutting in different ways. As always, their near-term course is uncertain.

GDP growth has fallen into a mild recession, and the recent "recovery" has been moderated by continued weakness in manufacturing, so that it has been termed a "jobless recovery". Strong GDP growth has been related to, and potentially benefiting from, a historic housing construction boom. This has been accompanied by substantial inflation in house prices relative to incomes. The role of historically low interest rates in promoting this boom has probably been exaggerated. Strong housing construction has maintained softwood lumber production at all time highs, yet at times prices have been very low despite such high consumption levels. Currently, short interest term rates stand at unsustainably low levels, seemingly defying gravity. The realities of terrifying fiscal and trade deficits will begin to come to bear on interest rates and on GDP, perhaps sooner than later. Finally, the US dollar exchange rate in recent years has probably been responsible for much of the stress on US manufacturing, though certainly not all of it. How recent improvements in exchange rate conditions may moderate these impacts on the lumber and paper business remains uncertain. More importantly, whether the twin deficits can persist without major effects on the exchange rate for the dollar remains to be seen.

PAPER DOWNCYCLE

The North American paper industry has experienced a downcycle of unprecedented severity and duration. The response has been, in contrast to previous cycles, a major episode of consolidation, machine and mill closures, and restructuring. Losses in jobs and production, and increases in import market share have been continuous and demoralizing. The causes are numerous. They include aging mills, adverse exchange rates, and continued improvements in quality and cost competitiveness by offshore competitors. The natural maturing of US paper markets seems, perhaps understandably, to have caught industry managers off guard. From 1965 to 1992, US paper and board production doubled (Howard, 2003, p. 72), and then increased by another 14 million tons a year to reach its 1999 all time peak

Pulpwood usage in the U.S. fell by about 10% from 1994 to the year 2000 (including chips and residues). The U.S. Forest Service (USFS) predicts a further decline, and then a recovery, but the 1994 level will not be reached again until 2020. (Haynes, GTR 560, p. 76)

Rising imports have placed the paper industry in Maine as well as other regions that produce printing and writing (P&W) grades under severe stress. The USFS is predicting that imports to the US market will rise over the long term, doubling from 2000 to 2050, based largely on low cost supplies of tropical fiber. (GTR 560 p. 76)

LUMBER/PANELS UPCYCLE

Strong housing starts and resales have led to record softwood lumber consumption. Following the imposition of the countervail and antidumping duties and then a year or more of depressed prices, lumber markets recovered and prices returned to historic highs. Ordinarily this volatility would be bad news for lumber's long-term prospects. But by coincidence, steel prices were high during the same period. The OSB industry saw continued strong demand, and despite strong capacity increases, prices hit all time historic highs over the past year. It is possible that OSB producers are gaining an ability to price more effectively against softwood plywood sheathing grades instead of taking heavy discounts. (From an engineering standpoint the products are identical.)

SCALE ECONOMIES HAVE BEEN PERMANENTLY LOST

Across the board in Maine wood processing industries, solid and paper, scale economies have been permanently lost, with only minor exceptions. Elsewhere in North America, and offshore more notably, large scale mills are being built that will cumulatively tilt continental and global cost advantages away from Maine. This, combined with the age of the capital stock, means a steady erosion of competitiveness, especially in high volume products. Further, the move toward commodities of the leading printing and writing grades is nearly accomplished. There are no high profit niches for machines to flee to.

MAINE FIBER SUPPLIES – TIGHTER THAN WE THOUGHT

Despite capacity closures in Maine, wood fiber demand has remained strong. Yet, the ability of the resource and the logging sector to meet current needs is uncertain. The Daaquam mill proposal for Costigan is said to be indefinitely postponed. It is hard to believe that log supply is not involved, even though just a few years ago two smaller mills were operating in that area. More seriously, the restart of No. 11 at Millinocket has depended on bringing in pulp from Port Cartier, Quebec, on the north shore of the St. Lawrence. This is likely a transitional move, but it speaks loudly to the fiber supply situation in that part of Maine.

Mill restarts at Lincoln, Millinocket, East Millinocket, and Berlin/Gorham (NH) have occurred at times of tightening supply due to weather and restructuring in the logging sector. The result: delivered wood and chip prices have reached all time high levels that are likely unsustainable for any period of time.

Extremely tight fiber supplies are good for landowners and logging operators, but they deplete mill working capital and place Maine mills at an additional disadvantage for modernization investments. Evidence of difficulty in filling current wood needs renders capacity expansions less and less likely.

CORPORATE SECTOR REMAINS UNDER STRESS NATIONALLY

Despite improvements in 2003, return on capital employed for most major forest products manufacturing corporations with operations in Maine remains well below the cost of capital. Although there were mergers totalling $70 billion in assets in 2002 and 2003, consolidation and related rationalizations have not fully addressed this problem (PWC, 2004).

Strong wood products earnings have been helpful to earnings results of the integrated companies. Still, many of the biggest companies are trying to exit solid wood products manufacturing:

- Potlatch has sold its 3 Minnesota OSB mills to Ainsworth.
- Georgia Pacific is now virtually out of hardwood lumber, and has sold its distribution business.
- Louisiana Pacific announced intentions to sell all its stud mills and has sold several.
- Weyerhaeuser has sold board plants in Pennsylvania.
- Most dramatically, Boise sold off its entire wood products and paper business to re-focus on distribution following its Office Max acquisition (Wall Street loved it).
- International Paper has closed sawmills and recently sold off its recently acquired Weldwood business in Canada.

HARDWOOD LUMBER – IS THE WORST OVER?

Nationally, hardwood lumber experienced a severe contraction after 1999, with some estimates placing lost output at 30%. Others say the loss was less severe. There is a sense that a modest recovery is occurring. But major markets for hardwood have suffered permanent damage. The shrinkage of US manufacturing is reducing demand for pallets; higher imports of furniture are reducing sales to the furniture market. Markets are shrinking at both ends of the grade spectrum.

LOGGING/ HAULING SECTOR – BENDING BUT NOT BREAKING?

There is no need to belabor the challenges facing the logging sector. The sector is at a point where predictions are essentially impossible. But at a minimum, the marketplace seems to be telling us that sustaining current delivery volumes can only be done at delivered wood costs that are much higher than those prevailing just a few years ago. The implications for the very survival of at least some mills are serious.

Bottom Line: We are dealing with a complex industry enduring unprecedented stresses, and undergoing severe re-adjustments in response to them. These conditions make forecasting the future in any detail extremely difficult. The driving forces are national and global, not just local to Maine.

B. Emerging Forces

Short Term, 5-10 years: "The Dark Times"

CANADIAN LUMBER

In the near term, Canadian softwood lumber will remain a major factor in the North American market. Experience has shown that we have been unable to devise protectionist arrangements that can produce more benefits than their costs to the US industry and its customers. Anyone supposing that some real solution will be found that can yield sustainable prosperity for US lumber mills has not paid much attention to the actual experience of the past 20 years.

CHINA – IMPORTS TO US WILL INCREASE

China's economy is growing rapidly. Dollars brought in by exports are a principal factor. A huge workforce of hardworking people, virtual armies of resourceful entrepreneurs, and growing sophistication in manufacturing and distribution are potent economic realities. The growth in China's wood based industry is so rapid that the country is also quickly developing a low-cost wood machinery industry. In 5 to 10 years, Chinese producers will increasingly dominate the machinery sector. As its paper industry grows, China will develop a domestic paper machinery supply industry as well. Having a growing machinery sector will become an enduring source of competitive

advantage for Chinese producers. (Note: The US paper machinery sector is slowly dying as it has no domestic customers for new mills)

HARDWOOD PULP: HEADING FOR EXTINCTION IN NORTHEAST NORTH AMERICA

By end of this near-term period no one will be able to afford to make hardwood pulp in this region. The region's dependence on hardwood fiber is no longer an advantage. On a delivered basis the fiber is no longer cheap. Offshore sources are low in cost and production is growing rapidly. Their quality is high. Shrinkage at Old Town and Woodland are symptoms. The current troubles at Ste. Anne Nackawick reflect the same situation.

Hardwood pulp mills, integrated or otherwise, that do not find a sustainable business model will close permanently, more likely sooner than later.

Bottom Line: Maine's ability to compete in high volume products, whether traditional "commodities", or more highly processed "value added" items, is eroding fast. Maine's ability to attract capital to rectify the situation is declining

Longterm, 20-30 years: Potential resurgence

US Population growth presses against supply

The USFS Outlook expects US population to grow from 273 million in 1999 to 347 million by 2030 (Haynes, 2003). Allowing for the uncertain nature of population projections, these would seem reliable since much of the growth is from immigration and not solely a function of the reproductive behavior of current US residents. Even if average incomes do not rise as much as projected, a 27% increase in the number of consumers is bound to have potent implications for wood products consumption.

Canada Timber Production Declines

The peaking of Canadian production has been announced several times in recent decades, each time, in retrospect, prematurely. Yet the pressures are inexorable. The long-term outcome will probably be a decline in log harvest and end product output. This will occur at different rates in different regions. The high costs of intensive management to offset reduced availability of natural forest will be felt over time. Governments will become increasingly reluctant to make these investments. The basic production economics are marginal for many of these investments. Governments will be less and less likely to justify them based on short-term employment needs or long-term sustainability of industry. This is already evident in New Brunswick (negative reaction to recommendations made by the consulting firm Jaako Poyry), and is expected to result in significant cuts in harvest levels in Quebec in the near term (current re-evaluations of annual allowable cut; no-herbicide policy).

Third World Growth

Beyond 20-30 years, we may hope that rising prosperity of middle class consumers in India, China, and Brazil will result in those nations actually absorbing more of the output of their economies and becoming less dependent on exports as a driver of growth. In 2034, these nations will not be second or first world in terms of per capita incomes, but nonetheless they will be home to large and growing middle classes. Home Depot and others plan to be in a position to benefit from this and if successful, there will probably be more Home Depots in China than in the US. Larger homes with western-style furnishings will be important to this generation of consumers. We can expect Chinese consumers to more fully employ the Chinese furniture industry.

India and China will likely import considerably more wood than they do now. Over time this will play an important role in re-balancing world wood markets as the wave of tropical plantation harvests begins to peak.

Russia

Russian timber production appears to be increasing, following a dramatic collapse as the state-controlled economy of the Soviet era unraveled. Given the business realities,

distances, and costs involved, a major role for Russian wood on the world stage seems unlikely, even thirty years out. If the Russian economy can improve its performance and begin providing improved living standards to its citizens, wood will be used domestically. Remote Siberian wood, that could not reach western markets anyway, will be shipped to China.

The Russian mafia already poses a significant barrier to international investment. The stranglehold on the economy by the mafia in the ports and at the local level, and the big kleptocrats at the national level, challenge the rule of law in a fundamental way. The odds of them voluntarily relinquishing their power seem remote. Bottom line: I don't see Russia as an international factor of any importance in coming decades.

THE GLOBAL PLANTATION PRODUCTION WAVE PEAKS

Established plantations in the tropics and subtropics now total more than 60 million hectares. They are already providing a growing supply base for new industries in these regions, as well as for log and chip exports. Plantation harvests will rise even if no new ones are established, due to their age structure.
(Sedjo, 2003). In the long-term, competing land uses, potential second rotation decline on some soils, institutional instabilities, emerging insect and disease issues, and the filling up of low cost planting opportunities are likely to cause the total output to reach a plateau. The timing and pattern of this plateau will vary regionally, and surely cannot be foreseen with any precision. The plateau could occur beyond the 30-year time horizon of this analysis.

SPRAWL

A major negative factor in this time window is that the cumulative effects of sprawl across southern and central Maine will have had time to cause major reductions in wood availability. Evan Richert (2003, p. 216-224) estimates that half the towns in the southern seven counties have already reached "suburban" population densities. He projects that by 2020 the number of remaining rural towns could be cut in half once again. Research elsewhere (see Irland Group, 2003, chs. 7-9) has shown that population density and land use change can dramatically affect wood availability.

Considering all the factors involved, the chances that this can be ameliorated by public policy are virtually nil.

Bottom Line: Beyond 20-30 years, the indications are that a new period of improved demand and potential competitiveness for Maine wood and wood industry will come into view.

Maine's Niche

These strategic factors yield some ideas about the kinds of market options that have better survival potential for Maine than others.

CERTIFIED MARKETS AND GREEN BUILDING MATERIALS

With its large base of certified land, Maine has a strong interest in boosting market presence for labeled wood products. Experience indicates, however, how very difficult it is to achieve this.

Certification is not a slam-dunk. The Forest Stewardship Council (FSC) process continues to evolve. Maine already lost a significant piece of FSC land due to internal political problems within FSC that did not even occur within the US. Retention of the remaining FSC base is not a certainty. Certain internal FSC issues must show progress. Some market signs need to appear that offer at least symbolic recognition of FSC landowners' achievements.

Customized business plans need to be built for how state government, working with others, can use its capacity providing for information and education to:

- Help small firms enter the certified marketplace; and
- Educate consumers to promote the products.

Relying on large retailers, or national campaigns run by FSC promoters has not worked in the past and will not work in the future.

Unfortunately, the certified market is small at the retail and end user level. Many other landowners are trying to move into it, including the state lands in Minnesota, Wisconsin, and Michigan. Maine's current advantage of having a large area of certified forestland may prove to be temporary.

All the same, building on this opportunity is likely to be a useful part of business strategy for some firms, especially smaller ones serving niche markets. Certification will not protect large commodity producers, however, from aging mills, the logging sector's problems, world competition, and the tight fiber supply situation.

NEW LEVELS OF SERVICE

Anyone who has tried to buy upholstered furniture knows what poor service can be like. US producers, if they can improve service, have a chance to meet lower cost import competition. This concept of service needs to be applied throughout Maine industry. Best practice firms are already doing it, not only in furniture, but in many other fields and at all levels of the market. Rebuilding businesses to emphasize service will be critical.

Merely doing "value added" by further processing will fail. Maine cannot compete simply by adding processing steps to high cost raw materials using high cost labor and

energy, in a location at the corner of a continent at that. We need ideas for profit adding, not value adding. Value adding by improving service, however, probably has a future. Numerous examples, applied to furniture, are offered by Schuler and Buehlmann (2003).

REPROCESSOR OF IMPORTED HARDWOOD PULP & RECYCLED FIBER

The large supply expansion potential of low cost hardwood fiber in the tropics and subtropics demands a response in the US paper industry. It will take the form of US mills becoming ever more adept as re-processors of this fiber into the products North American customers want. This may fit well with business strategies of at least some tropical producers. Procter and Gamble, at Mehoopany PA, has closed its pulp operations that relied on high cost, long haul fiber from a fairly low-end mix of sources. It has expanded its tissue production using imported eucalyptus pulp, and this at a location some distance inland from saltwater. Simply duplicating this in Maine for tissue will probably not work, but the general concept needs to be considered.

PAPER: INVENT THE NEXT GENERATION OF SPECIALTIES

As the paper industry in the South grew after the 1940's, new, low cost mills pushed Northeastern mills out of packaging and newsprint grades, the very grades that built the Maine paper industry. The last newsprint machine was closed in 2001. The Maine industry naturally transitioned into higher technology papers, serving growing printing and writing markets with progressively more complex and demanding product traits. Some mills maintained substantial R&D staff onsite to meet customer needs. Such grades often used older, slower machines that were economical for short runs. In other grades, large new machines were built. In any event, the industry rebuilt itself over decades to meet new needs for which its fiber, energy situation, and mills were suited. Thirty to forty smaller mills did not survive this transition.

A new family of specialties with broad markets needs to be invented. This will be more difficult as it is not easy to see options with the necessary market size. Also, the technical capabilities have likely been depleted and we don't have 30-40 years to make this transition as we did the transition from commodity grades to printing and writing grades.

With the strength Maine has in its mills, supplier industries, and the University's paper technology program, there ought to be a way to mobilize these capabilities more effectively to retain existing jobs and bring new ideas into the marketplace.

DISTRIBUTORS/REPROCESSORS OF IMPORTED SOLID WOOD AND WOOD PARTS/COMPONENTS

A tidal wave of offshore wood, some of it of very high quality, is a reality. The height of this wave will only increase. The trick will be to turn this to advantage. I am acquainted with one individual who symbolizes what I mean. He formerly served a sales manager for a large white pine mill, and is now importing radiata pine for various kinds of lawn

and garden uses. There are other examples. People have seen the handwriting on the wall, have read the message, and are adapting.

BUILD ON DEVELOPMENTS AT AEWC CENTER AT ORONO

The technical capacity of the University for analyzing emerging forms of wood composites, as well as for traditional products, has been an underutilized resource. Experience shows that we are not very good at bringing laboratory innovations into commercial practice. We need to learn how to select new ideas better, and get them into the marketplace faster and more effectively. One clue might be that starting new companies to commercialize innovative products is very risky.

There are firms that are not interested in new products, new technologies, new machines, and new management methods. Forget about them. They will be gone by 2010.

A NEW FUTURE FOR WOOD BASED ENERGY & CHEMICALS?

I have no more clairvoyance than anyone else and do not know if the current high oil market will prove to be a new and permanent plateau of prices, or yet another brief spike followed by plunging prices. Yet the irony of the situation must be obvious. Shortsighted and foolish legislation and regulation have pushed us to delete wood-fired electric capacity, in the name of saving money for consumers. We've deregulated ourselves out of generating capacity that is now needed by consumers and, more importantly, by the state's wood industry.

The people who created this situation are clearly not the ones to fix it (surely they will all blame someone else). I don't know what to recommend now. But if we can find a new and more stable future for wood-based energy, it might represent one of the few (nay, very few) places where sound public policy could make a significant difference.

There has been a good deal of discussion on making chemicals out of wood. A meeting last spring at the University reviewed a number of interesting new developments and emerging ideas. The current discussion includes a good deal of wishful thinking and ignoring inconvenient realities. Yet, there may be something here. We should be watching.

Bottom Line: Acknowledge that we still need major changes. Big new ideas will be needed and it is not clear where they will come from. Time is not on our side. Adjustment options are more realistic, and success more likely, for smaller, more nimble companies with strong marketing cultures.
Problem: The focus needs to be on small/medium business sector, as large corporations are not well suited to the kinds of business innovations required.

D. Industry/Government Priority Actions

RECOGNIZE MATURITY OF SECTOR

It is important that government acknowledge the fact that we are dealing with mature (indeed, in some senses over-mature) industries.[244] Their capital stock is increasingly ancient and growing more outmoded every day. Criticizing management for this does no good, because no rational individual could possibly build new greenfield paper capacity in the US today and hope that it would ever pay out.

Trade policy has made a thorough hash of the softwood lumber situation. A brief period of quotas on imported clothespins expired after providing temporary relief. The US industry then disappeared. Efforts to protect the US furniture industry from a surge of Chinese imports are now under way, with uncertain prospects for success.

Trade policy cannot help us in the long run, though it may be helpful for periods of transition. This observation does not tell us what to do, but it helps tell us what *not* to do. Facing the facts has to be the first step.

RETAIN WORKING FOREST

The wood supply base is fragile. There is no room for unnecessary deletions. That said, I think there will be more confidence in future intensive management if we can complete the minimal system of representative reserves that has been advocated by Mac Hunter, Janet McMahon, and others over recent decades.

Working forest conservation easements remain the best tool in sight for immunizing the private forest base against subdividing and removal from availability for wood supply as well as recreation. Assuming a sprawl of tiny lots and gravel roads can be prevented, subdivision of huge properties into merely large ones, owned by various kinds of investors, need not be a threatening trend.

We can assume the reserve system on the Public Lands is largely complete and we should press for continued responsible timber management on the state's lands as well as on the nearby White Mountain National Forest, a small part of which rests in Maine.

SUPPORT – MORAL AND REAL – FOR INTENSIVE MANAGEMENT

The changes in forest landownership have reduced the average size of holdings, and in at least some instances have placed lands in the hands of investors who are unlikely to invest in intensive management practices. At the same time, some owners previously considered unlikely to invest in timber growing are doing so. Analysts over the years have argued that better management practices, including intensive practices, are badly

[244] By overmature, I mean that, in my opinion, US paper consumption on a per capita basis is much higher than is sustainable in the long-term. It will decline. The USFS projects it to increase by 2050. This is too optimistic.

needed. A major area for improvement is in developing implementable prescriptions that both boost production and quality at the same time as being more biodiversity –friendly.

State government must continue to encourage such practices and oppose placing unnecessary obstacles in the way of such investments. Selective use of some of these practices on state lands should be considered in suitable situations.

MARKET FORCES COULD PREVENT FOREST FROM REBOUNDING

The extreme fiber demand/supply pressures noted above could lead to a terrible tragedy. There may be no way to prevent the rebound of the forest now appearing in the statistics from being nipped in the bud a year at a time, a stand at a time, as trees continue to be cut prematurely, before reaching their best value growth potential. If this occurs, a good deal of the benefit from past intensive investments will be lost.

There are no obvious policy instruments to prevent this from happening, but we can keep track if and when it does. There has never been a time when current monitoring of forest and industry conditions is more important. The forthcoming Five Year Report (in draft now) incorporates major improvements over previous resource analysis. It demonstrates why it is critical to stay on track with the Annual program.

LOGGING SECTOR – H2B

The federally created, though accidental, ban of the bonded loggers this year is a horror story of colossal proportions. This has stricken at the very basis of the industry – its wood supply. The effective abolition of the H2 B program (a federal program that allows workers in from other countries) was a policy decision taken literally for no reason at all – it was a complete accident. No amount of soothing rhetoric, business financial aids, training programs, or conventional economic development programs can compensate for the blow to the business environment that this represents.

It is not a question of how much of the planned cut could be found without those workers -- clearly a lot of it has been. But, the costs of doing so are unsustainable. Maine's policy climate has suffered a severe blow.

Despite intense effort on this issue, there are few new ideas at hand about how to improve this situation. There are plenty of ideas that will make it worse.

CERTIFICATION & GREEN BUILDING

Those of us who have participated in and advocated environmental certification have to admit that it has been a lot harder than we thought to bring certified wood products to consumers and create true market-driven demand "pull-through" that will benefit producers and generate even token green premiums. Even getting boards to the store shelf with a label, without a premium, has largely eluded us so far.

Yet, certification and Green Building are some of the few new ideas out there that offer some hope for improved business, especially for smaller mills and value added operations. Some of the efforts to promote certification have been more driven by egos than economics, by ideology and knee-jerk polarization than by sound business ideas. It will be necessary to ignore the snake oil being pushed out there.

There are ideas on the table, among other places, in the Saxl Commission report. We don't need more committees. We just need to get to work in a street-smart, results oriented, ground-level way.

STATE PURCHASING

State government ought to have a purchasing program that offers suitable encouragement to producers of *all* green products, especially certified ones. This should be a considered policy, as suggested in the Saxl Committee report, and not a hasty and oversimplified one, or serial capitulations to the latest "embargo of the week " being pushed by some advocacy group. A sound purchasing policy by the state would then supply a base that could be cloned by other institutions in Maine.

An annual Green Purchasing conference, similar to one held a few years ago at College of the Atlantic, would provide a forum for sharing ideas and promoting the concept.

RE-WORK THE WOOD ENERGY SECTOR

Enough has been said above. This is important for a number of reasons.

SURVIVE TILL LONG-TERM GETS HERE & FOREST HAS REBOUNDED

Maine is in a position where it has little maneuvering room and few choices. Maine governments will have to continue responding to crises as they arise, to enable particular mills to survive a bit longer.

A number of weak spots in the State's business climate for capital intensive industry have been recognized for some time. These will have to be managed. For example, backsliding on workers' compensation must be avoided.

This will not go down well with some people, but perhaps we will have to wait another few years or so to reach dissolved oxygen standards (or other environmental standards) in a few places. This does not seem too great a sacrifice in view of what is at stake. There is an idea that just because the owners of some of the mills are multinationals that they can and will keep paying and paying and paying to address every newly discovered problem. It's not so.

Under a dark view of the outlook, there may be no program at all that can sustain the industry in anything like its present form. But it is clear to me that a great way to make

that dark scenario come true is to look the other way and pretend that these larger policy issues really don't matter. False optimism is our worst enemy.

Bottom Line: We have a duty to push as hard as we can to sustain the forest and the industry and to help new ideas emerge. We will have to take extra care to deflect folly and wishful thinking and stay focused. There are no guarantees.

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Jim Bowyer Comments Regarding the Lloyd Irland Paper

These comments are written following several readings of the October 26, 2004 paper "Maine's Future Forest Economy: Driving Forces, Niches, and Private/Government Priority Actions" by Lloyd Irland.

I should first note that I have great respect for Lloyd Irland's views on a wide spectrum of issues, having followed his work for over two decades. The fact that he has a long and continuing history of experience in Maine adds to his credibility in this project.

I do not disagree with much of what Lloyd has said in his report. Indeed, our two reports highlight many of the same issues and present similar views of global trends and what they might mean for the forest products industry within Maine. There are, however, a few areas in which we see things a bit differently:

- A rather dire situation regarding wood availability and costs is described and one suggestion focuses on government encouragement of more intensive forest management. On the other hand, the likelihood of reduced wood demand due to structural problems in the paper industry and competition from fast-growing plantations abroad are highlighted.

It is perhaps worth noting that the closure of just one or two of the state's paper mills, a development that appears likely, could have the effect of both increasing wood availability for remaining enterprises and lowering wood prices. The same result could be realized if significant volumes of plantation-grown fiber were to find its way into one or more of the state's paper mills as a substitute for locally-grown wood fiber.

In any event, given growing availability globally of low-cost fiber it may be a tough sell to convince landowners to invest in intensive forest management. While it may be a politically unpopular strategy, a policy of allowing market forces to push the least competitive mills to failure, followed by aggressive action once the least competitive 20 percent or so (as defined by wood consumption) have thrown in the towel may be worth considering.

- It is stated that China and India will likely import considerably more wood than they do now and that over time this will play an important role in re-balancing world wood markets as the wave of tropical plantation harvests begin to peak. A similar reference is made later to a plateau in plantation output.

My only comment here is that plantation establishment globally continues to proceed at a rate of about 12-13 million acres annually and that no peak in plantation establishment or in wood production from plantations is yet evident. In my view it is equally possible that plantation output will increase, rather than decrease, in the future.

- It is stated that a major role for Russia's forest and wood products sector on the world stage seems unlikely, even thirty years out.

Irland may well be correct, but I see it differently. Today, investment dollars are literally pouring into Russia from both the West (western Europe and North America) and from the East (from China, Japan, and South Korea). The primary focus is on development of products (including logs, and a number of primary and secondary products) for export. My guess is that developments in Russia's forest and wood products sector will begin to noticeably impact this sector globally within a decade or so.

- I am in total agreement with the statement to the effect that beyond 20 to 30 years a new period of improved demand for wood products will come into view.

- It is suggested that adding value to imported fiber is a concept that needs to be considered.

This is a great idea to a point. However, it is essential to realize that countries and regions all over the world are intent on pursuing exactly the same strategy. For the most part, those regions that are exporting logs and largely unprocessed fiber today are working hard to be exporters of lumber, paper, and a wide array of finished products in the relatively near future.

- I agree with the comments regarding certification and endorsement of the building of markets for certified products. This is in my view a good way to create a market niche and some insulation from competitive pressures arising from Asia – at least in the short run.

One comment in this regard that I heard at a very recent meeting of international timber traders is, however, a bit sobering. It was remarked that China today is buying up all of the certified product that it can get its hands on, positioning itself to serve the certified market as it emerges. I have not had time to check the veracity of this comment, but if true it adds a grain of salt to domestically focused certified market strategies.

THE OUTLOOK FOR MAINE'S FORESTRY AND FOREST PRODUCTS SECTOR — TRENDS AND POSSIBLE STRATEGIES FOR POSITIVELY SHAPING THE FUTURE

By

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Context

Maine has a large forest and wood-based industrial sector that is diversified across a number of segments, including pulp and paper, lumber, composite products, and a variety of secondary wood products. With some 30,000 people employed, forest-based manufacturing constitutes Maine's largest manufacturing industry accounting, according to the University of Maine's Dr. David Field, for 25 to 31 percent of Maine's manufacturing employment, roughly a third of the state's value added in manufacture, and 34 to 44 percent of the value of its total output of manufactured goods.

All is not well, however, with Maine's forestry and wood products sector. Over 3,500 jobs have been lost in the state's pulp and paper industry since 2000, and at least four of the state's 17 paper mills are currently in bankruptcy protection. There are similar problems in the non-paper side of the industry, with job losses in this area approaching 2,000 over the past three years.

Major Factors Currently Influencing the Global Forest Products Industry

There are a myriad of factors influencing the global forest products industry today. In many ways, it is a period of unprecedented change within the forestry and wood products sector.

At least eight major factors are driving change. These include:

- Globalization.
- The emergence of China as a major wood products manufacturer and consumer.
- The growth of forest-based industries in Pacific Rim countries, Russia and Eastern Europe, and the southern hemisphere.
- The extensive development of fast growing tree plantations and of what some refer to as the "wall of wood" globally.
- The ongoing trade imbalance between China and the U.S.
- Forest certification.
- The relatively recent and ongoing development of wood-based composite products technology.
- Rising waste paper recovery and reuse rates.

At least two additional factors, specific to North America, are influencing U.S. markets:

- The aging and pending retirement of the baby-boom generation.
- The ongoing U.S.-Canadian lumber trade dispute.

Globalization

Globalization is impacting all business sectors in virtually all countries. The forestry and wood products sector is no exception. One manifestation of globalization is the consolidation of manufacturing entities worldwide, often accompanied by transfers of ownership to corporations headquartered in distant locations. Such changes serve to intensify the focus of business toward profitability and tend to eliminate or erode allegiance to place that has characterized a number of locally owned firms over the past century. One result is that capital and jobs are flowing today to regions with low labor costs, with the trend accentuated by the diffusion of state-of-the-art technologies to all corners of the globe and expansion of transportation networks within a number of developing countries.

The net results of globalization on the forestry and wood products sector are rapidly rising wood products production and consumption within countries not historically noted as significant players in the industrial wood products arena and renewed industrial forest sector activity in countries recovering from previous economic decline. Countries in the former category include Brazil, Uruguay, Chile, China, and Vietnam, while those in the latter include Russia and countries of the CIS.

The Emergence of China as an Industrial Wood Products Manufacturer and Consumer

After centuries of economic and technological stagnation, China's economy now has the world's most rapidly growing economy. This follows adoption of internal reforms and trade liberalization policies. It is increasingly apparent that industrial and economic growth is not haphazard, but rather the result of careful, targeted planning focused on development of labor-intensive industries. Chinese importation of hardwood and softwood logs and lumber has risen over 760 and 330 percent, respectively, since 1996, and Chinese exports of secondary wood products have risen similarly. This is a very significant development. With momentum provided by very low labor rates and costs of regulatory compliance, China's exports of wood household furniture to the U.S. have increased by more than 2,366 percent over the past decade.

A similar trend can be seen in wood moldings and wood flooring, with exports from China to the U.S. since 1993 up by 8,400 percent and 1,350 percent, respectively. Large increases in net exports of wood kitchen cabinet components from China to the U.S. are also rising sharply. In many cases, Chinese products are manufactured from U.S. logs that are converted to products that, in turn, are offered in U.S. markets at prices well below those of U.S. producers. Further growth of Chinese industries is expected, as is further loss of U.S. market share to Chinese products. U.S. industry segments impacted to the greatest extent thus far by competition from China are those characterized by high labor intensity. Labor-intensive enterprises that have not kept pace with technological

advances through ongoing research and development activity and reinvestment are being doubly impacted.

As China assumes an increasing role as an exporter of products of all kinds, including wood products, per capita income within China is rising. As a result, internal demand for a wide range of products is growing rapidly, and among these are a number of types of wood and wood products. Although Chinese dwellings are seldom constructed principally of wood, it is common to use wood for moldings and doors, partitions, and furniture. Moreover, interest in wood framing as a method of construction is slowly gaining acceptance and momentum. The significance of these realities lies in the fact that very rapid construction of new housing units is occurring within China, with the average size unit far larger than only a few years ago. For instance, apartment units being built today provide approximately 20-24 square meters (215-260 square feet) per resident, still small by western standards, but up from 4 square meters per resident less than 25 years ago. The impact on China's wood products consumption is substantial.

Growth of wood products consumption within China brings with it export opportunities for U.S. producers. Over the past 7 to 8 years U.S. exports of wood products to China have increased significantly for a range of products including treated lumber, flooring, molding, veneer, hardboard, medium-density fiberboard, particleboard, cooperage, and a number of miscellaneous products.

Growth of Forest-Based Industries in the Pacific Rim, the CIS, and Eastern Europe, and in the Southern Hemisphere

While China provides the most spectacular example of expanding forest and wood product sector activity, this is not the only nation presenting a rising challenge to established firms and regions in this sector. For example, the forest and wood products sector is currently undergoing a rapid expansion in Russia and within countries of Eastern Europe generally. Russia alone has recently identified the potential for annual production of timber of 559 million cubic meters (compared to total removals of 447 million cubic meters in the U.S. in 2002). In comparison to Russian harvest levels of the past 15 years almost all of the potential Russian harvest represents new supplies for future wood products manufacturing.

Relative wood abundance in Russia is now attracting a massive influx of new capital to the wood products industry of that country. In addition, markets for Russian wood in China are growing rapidly, and large, well-capitalized processing facilities are under construction along the Russian/Chinese border. As in China, labor rates and costs of regulatory compliance are lower than in the U.S. In addition, wood costs are generally significantly lower than in the U.S.

Other regions that are currently building capacity in the forestry and wood products sector are several of those along the Pacific Rim (in addition to China), and the southern hemisphere countries generally, most notably Brazil and Chile.

All of these developments have implications for producers in the United States and the State of Maine. Brazil, for instance, has recently replaced the U.S. as the largest offshore supplier of softwood plywood to the European Union, and imports of hardwood and softwood moldings and trim from Chile and New Zealand have increased by 759 and 494 percent, respectively, over the past decade. Further, net U.S. imports of wood furniture from Brazil, and Indonesia have increased 566 and 383 percent, respectively, since 1993.

Plantations and the Wall of Wood

Over the past two decades, and in an accelerating trend from the 1980s to the present, over 300 million acres of fast-growing plantations have been established around the world. These are increasingly concentrated in the southern hemisphere on highly productive sites. Such plantations account for only about 4.2 percent of forests globally but provide some 21 to 22 percent of the total annual wood harvest. This percentage is expected to rise to 40 percent by 2045 as large areas of highly productive plantations reach harvestable age within the next 10 to 15 years. This development, coupled with revitalization of the Russian forestry sector and increasing availability of tropical hardwoods, translates to a great abundance of available wood – a virtual wall of wood – worldwide. Such wood is typically low cost and often environmentally certified.

While tree plantations are largely focused on production of pulpwood and on softwood sawlogs, there are currently a number of initiatives underway globally to establish plantations of high quality hardwood sawlogs.

The availability of plantation wood raises the prospect of significant competition with domestic timber stocks and eventual shifts of wood product manufacturing activity to regions in which plantations are located.

The Ongoing Trade Imbalance Between the U.S. and China

The longstanding and continuing trade imbalance between the United States and China impacts indirectly the competitiveness of U.S. industry. One impact is on transportation costs that should effectively prohibit China's current practice of purchasing U.S. logs, processing them to products, and reshipping to U.S. markets at highly competitive prices. However, the availability of thousands upon thousands of containers that carry Chinese goods to the U.S. and that would otherwise have to return empty to Chinese ports provide an almost free avenue for conveying logs, lumber, chips, wastepaper and other industrial raw materials to China.

Forest Certification

Arising from concerns about tropical deforestation, various systems for certifying responsible forest management are being promoted worldwide. Today, approximately 6.5 percent of global forests have been certified under one or more of these systems.

Ironically, the majority of forests that have been certified to date (i.e. those in the United States, Canada, and western Europe) are precisely those most likely to be impacted by loss of wood and wood products markets to developing regions. Conversely, those regions most likely to be the focus of future forest sector development and increasing harvest pressures (Russia, southeast Asia, and the southern hemisphere) have only miniscule areas of certified forests, and the bulk of these are plantations.

The jury is still out on the question of whether forest certification will have a major impact on global forest products markets. For now at least it appears that the availability of certified wood could differentiate products made from such wood from the increasing volumes of non-certified products flowing from China.

Studies consistently show that there is a segment of the U.S. population that is prone to consider environmental attributes of products when making purchase decisions, and to pay a slight premium to obtain them. Such people are primarily those in higher income brackets.

Development of Wood-Based Composite Products Technology

The development of wood-based composite products allows the use of small-diameter logs of low specific gravity and inherently low strength in the manufacture of large-sized structural timbers. Juvenile wood, a significant problem when rapidly grown trees are used to make solid-sawn lumber, has been shown to be much less problematic in composite lumber. Composite lumber products are steadily growing in market share and may eventually totally displace solid sawn lumber, or at least sawn lumber of large cross-section.

One implication of composite products technology is that large diameter trees will be less and less important, and in all likelihood less valuable, as a raw material for production of structural wood products. Another implication is that the usefulness of wood produced in rapidly grown plantations is no longer limited to paper and fiber products production.

Rising Waste Paper Recovery and Reuse Rates

Wastepaper recovery and reuse rates are rising worldwide. In the U.S., recovery of waste paper for recycling reached 50 percent for the first time in 2003, and a goal of 55 percent recovery has been set. The recovery rate in Europe is similar. Virtually all of this paper is reused in the papermaking process, although in North America a considerable quantity of waste paper (over one-fourth of that recovered) is exported for conversion to paper elsewhere.

Even though rising paper consumption has necessitated increased pulpwood harvests, the increase in the recycling rate has significantly diminished the present need for pulpwood harvest as compared to what harvest levels would have been without recycling. Further increases in the recycling rate are likely.

Higher recovery and reuse rates not only dampen growth in pulpwood demand, but also increase the possibility of paper production at locations far from the forest. Today, for example, China is aggressively purchasing U.S. recovered waste paper and is using this to manufacture paper, a portion of which is re-exported to the U.S.

Aging of Babyboomers

The aging and pending retirement from the workforce of the generally affluent U.S. babyboom generation coincides with unprecedented demand for second homes and a trend toward high-end amenities, including furnishings. This group represents a potential market for new and innovative products that cater to consumers for whom price is perhaps a secondary consideration. It is these consumers who are most likely to be attracted to high quality or heirloom products customized to individual tastes and to products linked to favorable environmental attributes.

Ongoing Lumber Trade Dispute with Canada

The lengthy and ongoing lumber trade dispute with Canada has affected the U.S. industry in a number of ways, one of which is a negative image among many U.S. home builders, architects, and homebuyers who view associated U.S. import duties as protectionist actions that serve to drive up prices. Ironically, U.S. forest regulations and management practices do not allow production of sufficient volumes of softwood lumber to meet domestic needs, translating to an ongoing need for importation of over one-third of U.S. consumption.

Emerging Factors That Are Not Yet Apparent

In addition to the major factors that are widely recognized as influencing the global forest products industry, several other change-driving factors, or mega-trends, are only now emerging. These include the likelihood of petroleum scarcity within the relatively near term, the coming bio-revolution, rapidly growing global demand for housing, and the prospect for implementation of a life cycle-based product labeling program within the U.S. and Canada.

Oil Scarcity

After decades of discourse that for the most part led citizens to conclude that oil could last indefinitely, peak oil production is now a likelihood within the relatively near term. Projections from a number of energy forecasting agencies are beginning to converge on the period 2010 to 2020 (OECD International Energy Agency) to 2037 (USDOE) as that in which peak production worldwide will occur. The implications for virtually all aspects of the global society are profound.

Nations or regions that are able to position themselves for a smooth transition to alternative sources of energy are likely to fare far better economically and otherwise than nations or regions that do not adequately anticipate or adapt to change. An open question

is how China's burgeoning economy will fare in a petroleum-scarce world, given the paucity of energy resources within that country. Indeed, how the U.S. will fare is less than clear, as thus far relatively little attention has been given to this nation's energy future.

All sectors will be affected by petroleum scarcity, including the forestry and wood products sector. It appears, however, that this sector may fare much better than other sectors in view of its history of wood-to-energy conversion and relative independence from utility-produced energy. It is clear in any event that in the not-too-distant future prices of wood in any form will have to reflect the value of wood as an energy source.

The Coming Bio-Revolution

The long rumored bio-revolution is now at hand. Technology is available today that allows the use of biomass as a raw material for production of virtually all of the various products now obtained from petroleum. This reality is not lost on the North American pulp and paper industry which is now actively planning for conversion of its pulp mills from pulp production centers to full bio-refineries capable of producing a full range of biochemicals, biofeedstocks, and various forms of energy in addition to wood pulp. It is envisioned that this conversion will result in the ability to produce energy well beyond the internal needs of the bio-refinery; in other words, the bio-refinery will be energy self-sufficient and will also sell energy to the regional energy grid or to regional markets in the form of liquid fuels. This transition will require massive investment, but is also expected to significantly enhance industry profitability.

Bio-refinery development will not be limited to forested areas but will also occur within agricultural regions, fed by agricultural crop residues or dedicated fiber crops. However, it now appears that woody materials may be the raw material of choice.

Expanding Global Demand for Housing

Considering all factors, as many as *750 million to one billion* new housing units will be needed globally by 2050. Who will supply these units and the construction materials for them remains to be seen. Successes of emerging economies are fueling growth of consumer classes in regions long dominated by poverty. These are generally the same areas of the world in which population growth is greatest. The combined effect of rising incomes and expanding populations is increasing demand for housing. In some cases, young couples, who previously would have had to live for a number of years with parents because of housing cost and non-availability, are gaining the ability to buy or rent housing units of their own. In other instances continued growth of the population, expected to expand by 50 percent globally by 2050, is driving rising needs for housing.

Environmental Labeling of Products Based on LCA/LCI

European countries have long had labeling programs for a wide variety of consumer goods to provide environmentally conscious consumers with information about

environmental attributes of products. Now, as a result of work over the last several years on the part of the U.S. Environmental Protection Agency and the U.S. Department of Energy, much of the groundwork for product labeling within the U.S. has been laid through an initiative known as the U.S. Database Project. Under this project, life cycle inventory data is being collected for a wide range of industries, including the wood products industry. This data will provide a means of benchmarking environmental performance within particular industries and prioritizing environmentally oriented investment decisions. This information also provides a basis for environmental-attributes labeling of a wide range of products. The program could lead to the world's first environmental labeling program based wholly on internationally accepted protocols for life cycle inventory/life cycle analysis. This development is significant for the wood products industry because wood products tend to compare very favorably from an environmental perspective to common substitute materials.

What Might Be Maine's Niche?

Identifying options that might realistically provide Maine's forest and wood products sector with a defensible niche in global markets requires both careful consideration of current trends and emerging factors that are likely to influence Maine's forest and wood products sector and identification of Maine's competitive advantages.

Some of Maine's competitive advantages are:

- It has abundant forest resources.
- Many of its forests are certified as responsibly managed and current initiatives are directed toward bringing even more acres under certification.
- It has a long-established and extensive forest-based industry, including experienced artisans and woodworkers and a sizeable pulp and paper industry and associated supplier network.
- It has a reputation as a pristine and environmentally responsible region.
- It has an extensive transportation infrastructure.
- It is located close to population centers in the Northeast.
- It is well positioned geographically to efficiently provide just-in-time delivery to distributors of manufactured goods.
- It is a coastal state, with direct access to Atlantic trade routes.
- It has a world-class advanced composites research center.

In view of trends and emerging factors discussed earlier, what might be Maine's niche opportunities in the global forestry and wood products arena? Possibilities include:

<u>A center of highly mechanized, mass customization of made-to-order, heirloom quality furniture, cabinets, doors, moldings, and other wood products.</u>

Today much of the automobile industry operates on a business model in which vehicles are not manufactured until they are ordered, with the customer able to specify interior and exterior colors, engine size, sound and climate control

options, and a host of other features. In most cases, the customer is able to view options and complete an order using the Internet. This is an example of a mass customization model.

Given the large and aging U.S. babyboomer population, many of whom are financially able and inclined to purchase high-end products for primary and secondary homes, there may be an opportunity for a large-scale similar model in wood products; indeed, at least one such company is currently in operation. This kind of entity would offer made-to-order cabinets and furniture with custom sizes, moldings, decorative accent colors, custom engravings, custom veneers and lay-up patterns, environmentally certified or non-certified wood, and so on, that could be designed and ordered by the customer via the World Wide Web. A similar approach could be taken for outdoor furniture, components for decks, interior and exterior doors, flooring, paneling, moldings and stair railings.

A critical mass of bio-industry/bio-refinery companies and associated companies that use biofeedstocks and biochemicals as raw materials.

Maine currently has a sizeable pulp and paper industry that is served by a complementary forestry and forest harvest and supplier network and infrastructure. Many of these same elements could support a network of bio-refineries, producing a wide range of products, including energy. Success could lead to new companies focused on use of biochemicals and biofeedstocks for production of a new family of bio-based products as well as goods now manufactured from petroleum by-products.

A center of low-cost housing design, component manufacture, production, and distribution focused on housing needs of rapidly developing nations.

Envisioned is an intellectual and industrial center dedicated to production of housing "packages" for addressing housing needs in the world's developing regions. The center would perhaps focus on only one or two specific countries, at least initially, and bring a high level of innovation to design and delivery concepts, as well as sophisticated automation to allow production of low-cost, but highly durable housing units. Such an undertaking would perhaps be complementary to the bio-refinery and bioproducts concepts, as well as to development of advanced wood-based biocomposites.

A highly publicized center of exquisite quality, environmentally responsible products made of certified wood and perhaps identified with "Made in Maine" and/or life cycle-based product labels.

Such a strategy might work if promotional efforts were concentrated on the segment of high-end consumers most likely to be willing to pay for environmental attributes. A caution regarding this strategy: at least three other states – Oregon,

Minnesota, and Michigan are pursuing or seriously considering implementation of similar strategies.

A concentration of paper manufacturers using various combinations of 100 percent certified roundwood and recycled fiber with the goal of enhancing Maine's image as a place to come for environmentally responsible products.

Take advantage of Maine's proximity to Northeastern urban and wastepaper generating centers, as well as the long history of papermaking, to move heavily and very visibly into "environmental paper" markets. This strategy would be compatible with the bio-refinery concept and with a strategy of developing environmentally responsible, "Made in Maine" industries.

A center of advanced wood-based composites products manufacturing.

Maine could build upon the successes of the University of Maine's Advanced Wood Composites Research Center to commercialize new products and create new businesses dedicated to production of highly durable, engineered niche products for a variety of markets. This kind of initiative would complement the bio-refinery and (perhaps) the housing center concepts, as well as strategies to increase the use of recycled fiber.

A duty-free U.S./Canada enterprise zone located on the Maine/Canada border

In view of intense and rising competition within the forestry and wood products sector from outside the borders of the U.S. and Canada, some kind of initiative to foster U.S./Canadian cooperation could potentially improve the competitiveness of the industries of both countries, while also improving the image of the U.S. industry among consumers.

How Can Maine's Government and Industry Leverage the State's Competitive Advantages?

What steps might be taken to bring about positive change in the forestry and wood products sector of Maine?

In general terms, it may be worthwhile to engage the Maine forestry and wood products sector in discussions regarding new global realities and competitive challenges facing this sector and to lay the basis for innovative thinking around repositioning associated industries. Assistance with obtaining benchmarking productivity data from other states and regions, and with facilitation of workshops and seminars focused on lean manufacturing and similar topics, and on increased understanding of expanding wood products markets within China and other emerging economies might also be useful.

More specifically, actions might target some of the niche areas identified earlier.

Develop a Mass-Customization Business Model

- Identify existing companies that might be amenable to adoption of mass customization.

- Seek to create an academic center of excellence and business incubator zone focused on mass customization.

- Consider how governmental entities and programs might be used to encourage business development in this area.

- Seek consulting assistance from those working in the mass customization arena.

Develop a Network of Bio-Refineries

- Conduct a preliminary feasibility study of the prospects for a bio-chemicals / bio-energy industry in Maine.

- Engage the state's pulp and paper mills in dialog regarding their interest in potential conversion to bio-refineries. Seek to understand what actions might enhance the possibility of Maine becoming a focus of early adoption of the bio-refinery model, including needed actions in attracting investment capital. Similarly, engage in discussions with the State's energy utilities.

- Identify remaining technical barriers to realization of a commercial biochemical/ bioenergy industry and call upon expertise in the University of Maine and elsewhere to solve them.

- Consider regulatory and other barriers.

Develop a Global Housing Innovation/Industrial Complex

- Conduct a preliminary analysis of developing-country housing needs in regions that might logically be served by Maine producers, including size and amenity requirements, probable price points, and other factors. Seek to understand customs, attitudes, accepted business protocols, etc. in countries and regions of interest.

- Engage the state's manufactured housing industry and others in dialog regarding their interest in an industrial housing initiative.

- Develop a conceptual model identifying component parts of a functioning global housing complex and an outline of how such a complex would function.

Position Maine as a Source of Environmentally Preferable Products

- Engage in strategic thinking from a marketing perspective to identify cost-effective steps that could be taken to position Maine as an environmental leader in the minds of consumers.

- Bring together business, industry, academic, government and environmental leaders to consider whether such an initiative might be mutually embraced.

- Seek to become a leader in environmental-attributes labeling of products.

Establish a U.S./Canadian Wood Products Enterprise Zone

- Explore with federal authorities the possibility of creating a duty-free lumber and wood products enterprise zone on the Maine/Canadian border.

- Convene a meeting of U.S. and Canadian interests to explore potential uses of a duty-free enterprise zone (such as, perhaps, a U.S./Canadian global housing innovation and manufacturing complex).

Conclusions

Dramatic changes are occurring in the forestry and wood products sector worldwide that markedly enhance the global competitiveness of developing nations. These changes represent a significant threat to established firms in economically developed regions, such as those in the State of Maine. Given this situation, bold new strategies and actions will be needed to ensure continued vitality of Maine's forestry and wood products sector. Timing in this regard is critical, as the rate of change in competitive factors is rapid, and the likely costs of delay in responding quite high.

Lloyd Irland Comments Regarding the Jim Bowyer Paper

For this essay, I would like to comment on a number of points stimulated by Bowyer's paper. I do not format this as a line-by-line or point-by-point series of comments following his essay, but do comment on many of his points.

We need a clearer understanding of globalization

Clearly globalization is critical, yet we may all be talking about different things in using the term. Much of globalization's impact is through the market itself, and not through business consolidations or multinational buying and selling of assets. Improved and lower cost communications and logistics management accounts for much of this.

At this point there does not exist a single truly "global" paper company; the same is true for lumber and certainly true for value added products. By and large, multinational investment is bilateral, or confined to a small number of locations.

Seeing names like Stora and UPM in the northern U.S. is unfamiliar to us, and has happened very quickly. Yet this is not really a significant change in the US paper industry as a whole. Globalization is a lot bigger than this.

I have the impression that North American firms are actually behind the curve when it comes to globalization – the most globally diversified companies are not the American ones, and probably not the Canadian ones either.

We need a richer vocabulary for understanding different dimensions of globalization, how they affect the US wood sector, and what it all means for Maine.

Globalization is not the Cause of everything that's going on

Mills are getting closed because they cannot compete. This is not caused by globalization. If you look at producer price indexes for value added wood products, they show cost inflation well beyond the average for the PPI as a whole, and far higher than competing materials like plastics and steel. This was not caused by globalization, yet it certainly suggests a price competitiveness problem that creates opportunities for offshore competitors.

The truth is that our industries have been sheltered from offshore competition by a number of factors. Only recently have they been forced to face serious offshore competition, due to some of the forces Bowyer mentions, as well as trade liberalization.

Globalization is not the reason that no greenfield pulp and paper mill complex based on virgin fiber has been built in the US since the late 80's. When an offshore company buys one of the existing museum pieces, it is not the fault of "globalization" that they are compelled to tear out machines and downsize to remain competitive. Many of the mills are small, ancient, and noncompetitive in the current century.

Plant shutdowns due to consolidation are occurring due to largely domestic mergers (IP-Champion, etc), and the dramatic and unexpected shrinkage in demand (see below). Globalization is not the fundamental cause of the over-saturation of our paper markets and resultant woes of the paper industry, nor of the maturity of the solid wood sector.

China

Bowyer's observation about the huge flow of empty containers westbound across the Pacific is an important one. What opportunities might this create for us to ship something besides wastepaper and logs?

Are there some large Chinese organizations that would seek joint venture partners to source particular types of wood products or blanks in the U.S.?

It has taken decades to learn to serve the Japanese market; just as soon as we think we get it, their market changes decisively. For too long we complacently assumed they would happily buy overpriced logs till kingdom come. What we think we know about Japan will not apply to China; we must start all over.

Russia

I see Russia largely serving its own (hopefully) growing internal needs for wood, those of traditional Northern European customers, and the log requirements of China. Their paper industry is not competitive even with neighbors. I think very large bilateral Russia-China log trade can occur without much effect on the rest of the world's softwood markets. Sooner rather than later, this will be limited by the transport costs that render much of the Siberian wood inaccessible now and for decades to come. Russia may get the worst hit of anyone from the "Wall of Wood".

Composites

Big picture, I suspect emerging composites technology will benefit Maine's competitors more than Maine – other areas have energy costs, shipping costs, proximity to value added users, and pools of unused fiber. I'm guessing the potential for Maine will have to be in specialty niches – we need to stay out of the way of high volume commodity producers. Just what those niches are, however, I cannot say.

Waste Paper and Pulpwood

I have not sufficiently appreciated the recent interactions between paper demand, recycling, and pulpwood demand. A few points –

- Demand grew rapidly for both paper and pulp from the 70's through 1999. In that year, the all-time peak for paper and board "new supply" (= consumption) of 105 million tons was reached. Consumption crashed by 8 million tons in the next 3

years, recovering slightly in 2002. This was a huge reversal in the supply/demand balance.

- The root cause was not imports, though they had been rising steadily up to 1999. Imports of paper and board were roughly constant 1999-2002.
- US pulp production peaked at 66 million tons in 1998, and exceeded 65 million tons in 1992, 94,and 98. Production then fell out of bed, from 66. 6 million in 1998 to 58.1 million by 2002, a loss of more than 8 million tons. This loss was far larger than Maine's production.
- Growth in US pulpwood consumption essentially stopped in 1987, and was not drawn further upward by rising paper usage. After 1987, there were only 3 years when production exceeded 93 million tons – 1988, 1994, and 1995. On these figures, US pulpwood usage stopped growing 17 years ago, and then fell with a thud after 1997, losing almost 10 million cords. (N.B., this is roundwood plus chips)

It has taken us some time to adjust our thinking to the plateauing and then the decline in these production volumes. We may yet not fully appreciate the causes or understand the outlook. At the very least, it seems to me that the latest USFS output projections do not adequately allow for the implications of recent market trends. (source: FPL –RP-615, 2003.)

Bio-Revolution

I have not been following paper industry thinking on this subject. It would be worth catching up on that. It is by no means obvious, however, that Maine offers a competitive location for such activities, either for conversions of existing mills or investment in Greenfield capacity. This question probably deserves at least a reconnaissance –level look.

Also, existing entrenched producers based on petroleum may not eagerly welcome bio-based competition and may have means of defending their market positions. The assumption that these markets are immense and offer high margins is unvalidated, so far as I am aware.

Maine's Niche

I think when you look at expansion potential, quality, and costs, Maine cannot be said to have "abundant" forest resources, in comparison to likely competitors.

We have had so many people busy tarnishing our reputation for environmental performance that I do not have a sense of what the outside world sees… but would hesitate to take that for granted.

I would not overemphasize the strength of our transportation infrastructure. I'm not sure our coastal location helps, as our ports are basically improvisations and vessel sailings are limited in frequency and destinations. Long ago, we built half the nation's shipping….

our waterfronts bustled. It's over. Much of our export tonnage goes to the world through ports elsewhere, or through points with little expansion potential.

Niches and Actions

All of Bowyer's suggestions deserve at least preliminary assessment and ranking for fatal flaws before proceeding to more fully develop one or more of them.

Comments on Jim Bowyer's and Lloyd Irland's papers for the Maine Future Forest Economy Project

By

Al Schuler
USDA Forest Service

In general, this is a tough assignment, finding opportunities for Maine's forest product industries in today's increasingly global business environment. Both authors have done an admirable job in addressing the mandate. However, when one looks at the "opportunities" identified, there aren't many that seem viable to me, at least in the short term (5 years). I think Irland does a better job in addressing opportunities and problems specific to Maine – he is probably more familiar because he has lived there for much of his life. He also identifies the problems/issues and potential solutions in a more realistic manner whereas Bowyer's essay is more academic (in my opinion). On second thought, Bowyer's ideas are more long term, and may come to fruition. Not sure of time frame however – Maine's existing industry may not be around to see the "changes".

Here are some specific comments:

1. **Fragmentation within the forest products industry is quite high, despite recent M&A activity.** Fragmentation makes it difficult to do relevant research and development (R&D) – how to obtain consensus re: what R&D needs to be done? Funding for R&D in forest products is terrible – less than 2% of sales and that is probably an optimistic number at that. The main public organization for conducting forestry R&D – the U.S. Forest Service – has changed R&D focus in response to shifting public interests. However, this has left the industry with a shortage of quality R&D in my opinion. Universities have taken up some of the slack, but research dollars are hard to come by. The equipment manufacturers do much of the R&D for the industry as a result. So, how to change this situation? I think the Federal government could take a more proactive role, but forestry has to be seen as being important to the U.S., and I'm not sure forestry has the ear of the necessary decision makers. For the most part, it is seen as a "sunset industry" - a similar situation exists in Canada, unfortunately. Somehow, this attitude needs to be changed or at least show the "powers that be" that the U.S. forest industry is losing (lost) its competitive position – just look at our trade flows – imports keep increasing while exports decrease for most products. And we are exporting logs – I thought only 3rd world countries did that???

2. **We need to benchmark both the hardwood and softwood industries *vis a vis* the rest of the world (primary and secondary sectors).** We need to do this to provide the basis for developing remedial strategies; realistic vision of future; and to convince the stakeholders what is right direction(s) to pursue. There are studies available in softwood arena I believe, but not much on hardwood side**.** *This is an area where the Forest Service might be able to help – benchmark our*

domestic hardwood industry (primary and secondary) vis a vis rest of world. Until this is done, I'm afraid identifying "opportunities for the U.S. and Maine" is mostly an academic exercise.

3**. Certification/certified products may turn out to be a good opportunity for Maine, but I'm not sure when this will become profitable.**

4. **Our industry does a poor job (in my opinion) in investing (in domestic mills) in their future – CAPEX spending is less than Canada and Europe.** One reason may be the regulations in USA versus rest of the world. It takes 12-18 months to go through the permitting process for a sawmill, similar time for OSB in several southern states – not conducive to investing capital I'm afraid. This issue has to be addressed at the state and Federal levels. Why build a new mill in the USA when fiber is cheaper in South America; fewer regulations; …… as a result, several large U.S. companies – e.g., Weyerhaeuser – are investing heavily in South America and NZ – to source wood products for global markets including the U.S. Boise cascade, recently exited the business of manufacturing of forest products. And U.S. companies are divesting much of their forestland holdings. Clearly, the U.S. industry does not see the U.S. as a good place to invest – I'm exaggerating here, but the U.S. forest products industry has some difficult hurdles to overcome if it is to become globally competitive again. For some industries (most commodities), that probably is not possible. We need to add value (in excess of added cost) in order to move up the "food chain". If we don't, and we stay mired in commodity production, we will lose out to other regions that are more competitive for a host of reasons. I believe both Lloyd Irland and Jim Bowyer talked about the need for customized production in some wood product lines – yes, I agree. But, key question is – do we have a supply chain that will allow this to happen??

5**. Both authors discuss bio energy / bioconversion options. Not sure of timing for this – when will it become economically feasible?** We have been talking about oil shortages/prices for decades – mostly since the Oil Embargo of the 70's. But, we still haven't done much in my opinion to reduce our reliance on foreign imports. However, wood energy may be an option for some.

6. **Global demand for housing – nice idea, but it has been talked about for decades.** As the world's standard of living increases, demand for housing will definitely increase – but will it be wood frame housing? If it is, there are lots of alternative sources for framing lumber – Russia; Europe; maybe South America; …. In fact, there may be a glut of wood in the future? E.g., Bowyer's reference to the "wall of wood".

Conclusion: I agree with both authors – Irland and Bowyer – that bold new strategies need to be developed in order for Maine to move into the 21st century wood products arena profitably. The relevant stakeholders need to get together (conferences, etc.) and discuss the realities of the current situation; the realistic

options; how to execute strategies to achieve better times; and how to build consensus regarding future course(s) of action. Irland mentioned "trade policies" – the U.S. government needs to rethink this issue as "special interest groups" have dictated trade policy in softwood lumber for over 20 years. Because the industry is so fragmented, special interest groups are successful, unfortunately. The "business environment" for investing in U.S. greenfield mills is difficult – again, government needs to get involved to "level the playing field". Finally, we need to "move up the food chain" if we are to regain competitiveness and profitability. I don't think we can compete (or soon we will not be able to) in many commodity markets – U.S.A. or Maine. How (what skills, equipment, education, etc.) and where to move up the food chain – that is a key issue? Where can we be competitive??

Appendix C

Forest Industry Survey Cover Letter

Innovative Natural Resource Solutions LLC
107 Elm St., Suite 100-E, Portland, ME 04101
Phone 207/772-5440, www.inrsllc.com

April 2004

Name
Company
Address
Town

Dear Name,

Innovative Natural Resource Solutions LLC (INRS) is working with the Maine Forest Service, Department of Conservation and the Maine Technology Institute to anticipate and plan for changes to the state's forest industry. All sectors of Maine's forest industry face significant challenges – and many of these challenges are only expected to increase. An increasingly competitive global marketplace makes it critical for the state to take steps to work with Maine's forest industries to understand, evaluate and help address these challenges.

This survey is part of a detailed assessment of Maine's forest industries and their future. As a forest industry leader, your insight into the current state and future of the industry will help us better understand – and address – the challenges you face. We ask that this survey be completed by the person at your facility most familiar with the broad range of policy issues that impact your bottom line. Most often this will be a mill manager, owner, or other individual in a key management position.

Please take the time to complete this questionnaire and return it in the enclosed postage paid envelope. If there are questions you don't know the answer to, please write "don't know" near the question and move on. You may be assured of complete confidentiality. We do not ask you to put your name or business affiliation anywhere on the survey. The results will be presented in aggregate form only, and you will not be personally associated with the answers you give.

As a "thank you" for participating, when you have completed and mailed the survey please fill in your name and address on the enclosed post card, and mail it in separately. We'll select one respondent as the recipient of a $100 gift certificate from L.L. Bean

If you have any questions or concerns, or would like to supply additional information under separate cover, please do not hesitate to contact me at the above address, or at kingsley@inrsllc.com.

Again, we appreciate your time and insight.

Sincerely,

Eric Kingsley, Vice-President

Forest Industry Survey – Page 1

Facility Information

Please provide the following information so that we can better understand your business.

1. How would you characterize your facility?

Softwood Sawmill	☐	Pulp / Paper Mill	☐
Hardwood Sawmill	☐	Wood-energy facility	☐
Wood Product Manufacturer (turnery, furniture, etc.)	☐	Engineered wood products (OSB, plywood, etc.)	☐

2. What is the ownership structure of your facility?
   - Privately held – sole proprietor ☐
   - Privately held – group ☐
   - Publicly held ☐

3. How many employees do you currently have? _____ Full Time
   _____ Part Time
   _____ Seasonal

4. Are you the largest employer in the community where you are located (circle one)?
   Yes *No* *One of the largest*

5. Are you the largest taxpayer in the community where you are located (circle one)?
   Yes *No* *One of the largest*

6. What is your position at the mill / facility (circle one)?
   Owner *Manager* *Supervisor* *Other* _____

Competitive Pressures

7. Please check the three areas of the country or world that are the largest direct competitors with your facility, today and in the future:

Today	Location	5 Years	Location	10 Years
	Maine		Maine	
_____	New England	_____	New England	_____
	United States (other)		United States (other)	
_____	Canada	_____	Canada	_____
	South America		South America	
_____	Europe	_____	Europe	_____
	Asia		Asia	
	Australia / N.Z.		Australia / N.Z.	
_____	Russia	_____	Russia	_____
_____	Other (_____)	_____	Other (_____)	_____

Forest Industry Survey -- Page 2

Forest Industry Health

8. Please circle your perception of the forest industry's overall health -- today and in the future.

Today					5 Years			
Bad	Poor	Good	Excellent		Bad	Poor	Good	Excellent
1	2	3	4	Overall Industry Health (U.S.)	1	2	3	4
1	2	3	4	Overall Industry Health (ME)	1	2	3	4
1	2	3	4	Sector Industry Health (U.S.)	1	2	3	4
1	2	3	4	Sector Industry Health (Maine)	1	2	3	4
1	2	3	4	Your Firm's Health	1	2	3	4

9. In the past year, has your facility had curtailments / reductions in operations? *Yes* *No*

10. Has your facility made major investments in new equipment, or have plans to do so?
    _____ Within the past year
    _____ Plans for the coming year
    _____ Plans for the next 5 years

11. If you plan to make new investments, or have recently, please describe your source of capital.
    _____ Not applicable
    _____ Bank / lending institution
    _____ Private investor
    _____ Internal company sources
    _____ Other (please specify)_____

12. Do you believe that your facility will be operating in 20 years? *Yes* *No*

Programs Available to Maine Forest Industry

13. Please indicate your familiarity with the following programs available to Maine forest industries, and whether you believe these programs / organizations address your needs:

Awareness					Fits Your Needs			
Who?	Heard of	Very Familiar	Have Used		Don't Know	Not at All	Some-what	Very Well
1	2	3	4	FAME – Finance Authority of Maine	1	2	3	4
1	2	3	4	MTI – Maine Technology Institute	1	2	3	4
1	2	3	4	Efficiency Maine	1	2	3	4
1	2	3	4	Manufacturing Extension Partnership	1	2	3	4

Forest Industry Survey – Page 3

Doing Business in Maine

14. If your firm were considering a new forest industry operation (please assume necessary reso availability), would you consider locating in Maine? *Yes* *No*

    a. What other states, provinces or countries would you consider?

    _____

15. Do you currently generate electricity for your own use? *Yes* *No*

    a. If there were technical assistance or financial incentives to generate your own electricity, would you consider doing so? *Yes* *No*

    b. If generating your own electricity were cost-effective, what payback period would be required for you to give it serious consideration (in years)? _____

16. Do you currently have trouble finding qualified workers? *Yes* *No*

    a. Do you believe that you will have trouble finding qualified workers in 5 years? *Yes* *No*

17. Have you researched public sector or private sector workforce training opportunities?

    _____ Researched
    _____ Used
    _____ Not aware of any
    _____ Not an issue

18. Please estimate the average age of your employees (years) _____

19. When was the last time you hired a new employee? _____

20. When was the last time you laid an employee off? _____

Forest Industry Survey – Page 4

Technology Issues

21. Do you foresee major technology improvements in your sector in the next ten years?
    _____ Continued process improvement
    _____ Significant changes
    _____ Changes large enough to make existing mills obsolete
    _____ Significant changes in non-wood competitors with my sector

22. If you were looking at major technology changes, what could Maine do to encourage you to invest?
    _____ Technology transfer (getting information to mills)
    _____ Regulatory changes (e.g., permitting)
    _____ Regulatory stability
    _____ Tax changes
    _____ Tax stability
    _____ Funding assistance
    _____ Other (please specify_____)

23. For your forest industry sector, where do you see your facility in terms of new technology investment in the last 5 to 10 years (globally)?
    _____ Top 10%
    _____ Top 50%
    _____ Bottom 50%
    _____ Bottom 10%

Open-ended Questions

24. What is the most important thing Maine state government could do to help forest industries long-term competitive position? Why (please be as specific as possible)

25. What is the most important thing Maine forest industry could do to help its long-term competitive position? Why (please be as specific as possible)

Forest Industry Survey – Page 5

26. What would make you more likely to make capital investments in your Maine facility?

27. What would it take to have you make significant investments in energy conservation?

28. What would help you find, train and keep qualified workers for your facility?

29. If you had a problem with Maine state government, who would you call?

30. Is there anything else you would like to tell us?

Thank you for taking the time to complete this survey
Please return using enclosed self-address stamped envelope

Appendix D

Micro-Business Survey – Page 1

Maine Future Forest Economy Project – Survey of Forest Products Businesses

Facility Information

Please provide the following information so that we can better understand your business.

1. How would you characterize your business?
   - Softwood Sawmill ☐
   - Hardwood Sawmill ☐
   - Wood Product Manufacturer (turnery, furniture, etc.) ☐
   - Logger ☐
   - Other (describe) ☐

2. What is the ownership structure of your business?
   - Privately held – sole proprietor ☐
   - Privately held – group ☐
   - Other (specify) ☐

3. How many employees do you currently have? _____ Full Time
   _____ Part Time
   _____ Seasonal

4. What is your position at the mill / facility (circle one)?
   Owner *Manager* *Supervisor* *Other* _____

Competitive Pressures

5. Please check the three areas of the country or world that are the largest direct competitors with your business, today and in the future:

Today	Location	5 Years	Location	10 Years
_____	Maine	_____	Maine	_____
_____	New England	_____	New England	_____
_____	United States (other)	_____	United States (other)	_____
_____	Canada	_____	Canada	_____
_____	South America	_____	South America	_____
_____	Europe	_____	Europe	_____
_____	Asia	_____	Asia	_____
_____	Australia / N.Z.	_____	Australia / N.Z.	_____
_____	Russia	_____	Russia	_____
_____	Other (_____)	_____	Other (_____)	_____

Micro-Business Survey – Page 2

Forest Industry Health

6. Please circle your perception of the forest industry's overall health -- today and in the future.

Today					5 Years			
Bad	Poor	Good	Excellent		Bad	Poor	Good	Excellent
1	2	3	4	Overall Industry Health (U.S.)	1	2	3	4
1	2	3	4	Overall Industry Health (ME)	1	2	3	4
1	2	3	4	Sector Industry Health (U.S.)	1	2	3	4
1	2	3	4	Sector Industry Health (Maine)	1	2	3	4
1	2	3	4	Your Firm's Health	1	2	3	4

7. In the past year, has your facility had curtailments / reductions in operations? *Yes* *No*

8. Has your facility made major investments in new equipment, or have plans to do so?
   _____ Within the past year
   _____ Plans for the coming year
   _____ Plans for the next 5 years

9. If you plan to make new investments, or have recently, please describe your source of capital.
   _____ Not applicable
   _____ Bank / lending institution
   _____ Private investor
   _____ Internal company sources
   _____ Other (please specify)_____

10. Do you believe that your facility will be operating in 20 years? *Yes* *No*

11. Where do you get your raw material? (circle) Maine New Hampshire Canada Other (specify)

_____

12. Where do you get your components (turned parts or other wood components)?

Maine New Hampshire Canada Other (specify)

_____

13. Are you certified? (circle all that apply) FSC SFI Other (specify)

_____

14. Do you use rediscoverd wood to make your products? Yes No

15. Where do you market your products? (check all that apply, X the major method)
_____ direct sales (out of business location)
_____ internet
_____ gallery or shops

Micro-Business Survey – Page 3

_____ shows: retail or wholesale
_____ other (specify) _____

Programs Available to Maine Forest Industry

16. Please indicate your familiarity with the following programs available to Maine forest industries, and whether you believe these programs / organizations address your needs:

Awareness					Fits Your Needs			
Who?	**Heard of**	**Very Familiar**	**Have Used**		**Don't Know**	**Not at All**	**Some-what**	**Ver We**
1	2	3	4	FAME – Finance Authority of Maine	1	2	3	4
1	2	3	4	MTI – Maine Technology Institute	1	2	3	4
1	2	3	4	Efficiency Maine	1	2	3	4
1	2	3	4	Manufacturing Extension Partnership	1	2	3	4

Doing Business in Maine

17. If your firm were considering a new forest industry operation (please assume necessary resource availability), would you consider locating in Maine? *Yes* *No*

a. What other states, provinces or countries would you consider?
_____

18. Do you currently generate electricity for your own use? *Yes* *No*

a. If there were technical assistance or financial incentives to generate your own electricity, would you consider doing so? *Yes* *No*

b. If generating your own electricity were cost-effective, what payback period would be required for you to give it serious consideration (in years)? _____

19. Do you currently have trouble finding qualified workers? *Yes* *No*

a. Do you believe that you will have trouble finding qualified workers in 5 years? *Yes* *No*

20. Have you researched public sector or private sector workforce training opportunities?
_____ Researched
_____ Used
_____ Not aware of any
_____ Not an issue

Micro-Business Survey – Page 4

21. Please estimate the average age of your employees (years) _____

22. When was the last time you hired a new employee? _____

23. When was the last time you laid an employee off? _____

Technology Issues

24. Do you foresee major technology improvements in your sector in the next ten years?
    _____ Continued process improvement
    _____ Significant changes
    _____ Changes large enough to make existing mills obsolete
    _____ Significant changes in non-wood competitors with my sector

25. If you were looking at major technology changes, what could Maine do to encourage you to invest?
    _____ Technology transfer (getting information to mills)
    _____ Regulatory changes (e.g., permitting)
    _____ Regulatory stability
    _____ Tax changes
    _____ Tax stability
    _____ Funding assistance
    _____ Other (please specify_____)

26. For your forest industry sector, where do you see your facility in terms of new technology investment in the last 5 to 10 years (globally)?
    _____ Top 10%
    _____ Top 50%
    _____ Bottom 50%
    _____ Bottom 10%

Open-ended Questions

27. What is the most important thing Maine state government could do to help forest industries long-term competitive position? Why (please be as specific as possible)

Micro-Business Survey – Page 5

28. What is the most important thing Maine forest industry could do to help its long-term competitive position? Why (please be as specific as possible)

29. What would make you more likely to make capital investments in your Maine facility?

30. What would it take to have you make significant investments in energy conservation?

31. What would help you find, train and keep qualified workers for your facility?

32. If you had a problem with Maine state government, who would you call?

33. What could state do to help you market your products?

34. Is there anything else you would like to tell us?

Thank you for taking the time to complete this survey
Please return using enclosed self-address stamped envelope

Appendix E

Advisory Committee

During the course of this project, members of an advisory committee -- who have generously donated their time, experience and insight to help make this a better project -- have assisted the Department of Conservation and Innovative Natural Resource Solutions LLC. It should be noted that while these individuals have provided valuable input during every stage of this project, the members of the Advisory Committee and the organizations they work for do not necessarily support or endorse the findings and recommendations contained in this report. The advisory committee members are:

Name	Affiliation
Deborah Feck	Domtar Industries
John Williams	Maine Pulp & Paper Association
Bruce Bornstein	Isaacson Lumber (Board of Directors, Maine Technology Institute)
Chris Fitzpatrick	Machias Savings Bank
Christine Krauss	Maine WoodNet
Jim Robbins	Robbins Lumber
Martin Wilk	Eaton Peabody
Bruce Bryant	Maine State Senator
Habib Dagher	AEWC Center, University of Maine
Greg Moore	Pride Manufacturing
John Cashwell	Seven Islands Land Company
Dan Sosland	Environment Northeast

Additional input and Advisory Committee participation was provided by:

- Karen Mollander of the USDA Forest Service – State & Private and
- Peggy Schaffer of the Maine Department of Economic & Community Development.

Key participants in this project from the Department of Conservation – Maine Forest Service have included Alec Giffen, Henry Whittemore, Peter Beringer and Tom Doak.

Appendix F

Maine Forest Products Council
Annual Meeting Questions for Maine Future Forest Economy Project

On May 24,, 2004, two 90-minute workshops and listening sessions on the Maine Future Forest Economy Project were hosted by the Maine Forest Products Council (MFPC). These two workshops, held in conjunction with MFPC's Annual Meeting, were an opportunity for members of the Maine forest industry to provide ideas and comment to researchers of the Maine Future Forest Economy Project. These sessions were held at the invitation of the MFPC, and were presented and managed by Charles Levesque and Eric Kingsley of Innovative Natural Resource Solutions LLC.

During these two sessions, a total of 49 individuals shared thoughts and comments with researchers. The six questions participants were asked to respond to, as well as responses transcribed from flip charts used during the sessions, are listed below.

1. **What is the most important thing Maine forest industry could do to help its long-term competitive position?**

- Find a way to change legislators' perceptions (about industry)
- Turn around misperception of industry dying (labor stats)
    a) Improve productivity
    b) technology investment
    c) training
- Advocate for east/west highway
- Improve collaboration between sectors of industry
- Generate products public wants
- Transportation infrastructure: Show how hurting
    a) truck weights (look at issue)
    b) rail
- Work with tourism industry. i.e. send study out to other sectors
    a) "timber and tourism" logo (Lakes)
    b) (Lakes States Forest Alliance)
- Educate tourists about industry
- Education: a) MESAF poster contest for youth; do more like PLT
- Increase long-term wood supply (silvicultural investment)
- Engage in politics to encourage long term investment
- Investment—new plants to be competitive
- Reduce cost of manufacturing:
- investment
- increase output/productivity
- Increase return on capital
    a) NAFTA
    b) worker's comp
    c) Exchange rate
    d) cost of labor
- Reduce reliance on commodity (specialty paper)
- Move out of State?
- Small businesses—need more
- Financial info for decision making
    a) ex: increase for fuel costs
- Education of public and in schools (re forests and forest products
    a) PLT
    b) Investment by providing experts to Dept of Education for schools

2. **What would make you more likely to make capital investments in your Maine facility?**

- Change attitude of ME government /legislators
    a) Local officials' attitudes, too.
    b) (example: Raymond—regulate shipping containers)
- Policy stability
- Lower development hurdle (permitting licensing dollars)
- Ten to Fifteen year tax relief
- Making capital investment risk—alternative investment
- Rate of return (from financial community—based on selling the product.
- Value of collateral (turnkey mill worth a lot less than purchase price)
- Instability of tax structure inhibits investment (LD 1318 arbitration)
    a) affects company and lenders
    b) speak to investment bankers outside of Maine
- ME high-cost State—all costs reduce R & R
- Bad news about ME mill closures—perception breeds more negativity
- Consistency/stability of public policy

3. **What would it take for you to make significant investments in energy conservation or self-generation?**

- Complications of self-generation (supplier/user must work more in partnership)
- NEPool bi-frication in Maine problem
- Many businesses too small to self generate (instead transition)
- Focus on getting rates low enough to self-generation unnecessary
- Stop up and down changing energy policy (wood/bark…) stability
- Biomass plants genesis—flavor still affecting industry (uncertainty)
    a) cyclicality of alternative fuels was/is problem—policy to even cycles
    b) independent biomass scenario flawed because artificial prices
    c) (co-gen better)
- Key is to get power costs down

4. **What is the most important thing Maine state government could do to help forest industries long-term competitive position?**

- Stable long-term policy (all)
- Stability Issue: de-politicize the leadership of natural resource agencies
- Stop regulating to death (e.g. liquidation harvesting)
- Stop term-limits
- Stop referenda process
- Change mindset of natural resource government leaders is that forest products are dying.
- State Department of Education should educate youth re natural resource industries
- Government should continue to support R&D at UMO (engineered wood) seeking more forest product cluster development
- Look at weight limitation on I-95
- Support East/West highway (do for us, not tourism)
- Reduce tax burden (business equipment tax)
- State government should look carefully at what it is trying to accomplish environmentally compared to other states
- Reduce permitting time and cost—ex: new paper machine in existing mill
- ME/NH comparison—NH permitting 3 months, 18 months in ME (first level processing) brownfield quick permitting
- Healthcare—high cost, availability (address uninsured, mitigate)
- Improve transportation infrastructure:
    a) rail
    b) E/W Highway
    c) truck weight limit
    d) ports
    e) Searsport opportunity
- Look at Montreal industrial sites—preset investment by Canadian government into infrastructure
- Harmonization w/ Canada on truck weights

5. **Are there ways that Maine state government -- either directly or indirectly -- might help provide branding and marketing assistance to Maine forest industries?**

- Made in ME program in past…ME should promote again as government
- State be supportive of private sector initiatives (not State marketing)
- Not priority for State role (* No long-term commitment to anything in State government—here either)
- Public support for forest industries instead of branding… *also broker fees to large trade show to allow many companies to participate
- Direct marketing assistance…*not helpful when government not supporting
- Seldom government helpful
- Leverage Maine brand (ditto from other)
- Specialty product—branding makes sense:
    a) commodity, no
    b) consumer goods, yes
- Secondary—made in Maine mystique exists (CA furniture example)
- State government may not be best place for branding to be marketed.
- Industry should lead branding & marketing—government role is responding to industry

6. What else do we need to know?

- Polling purpose? Also ask industry same questions
- Project start? Seedling or? Northern/Southern ME…large vs. small tracts
- Look at biggest piece…pulp and paper…value added and commodity
- Survey/poll—ask simple. Knowledge questions (not attitudes)
    a) N/S=95—coast/95 North
- Landowner rights folks— "Mary Adams folks" owns a lot of land—can't ignore that
- Ask states that help forest industries—NC and Florida
- How competitive with States, Provinces and countries (Costs and public policy)
- Do something about sprawl—ME develops land inefficiently—taxation and chopping up resource.
- Grow Smart, good intentions but wrong for business. Southern ME and white pine.
- Steel making inroads in structural material market
- In VT agriculture is treated as god, ME forest industry should be treated like this
- Current rise in commodity prices if long-term, ramifications?
- Vision for Maine forest industry
- Maine forest products industry very influenced by neighbors (Canada)
    a) (Keep this as part of the discussion)
- Department of Conservation is the only one to "look after" forest products industry. Dept is too small/under funded to do the job
    a) developing alternate products (e.g.) glulam plant
    b) seed for ideas
- Case studies of range of companies that have shut down

Maine Forest Products Council Meeting Participants

Individual	Company
John Gray	Chadbourn Tree Farms
Bob Chadbourn	Chadbourn Tree Farms
Bill Sylvester	Clayton Lake Woodlands
Karin Tilberg	Dept. of Conservation
Jeff Baron	Farm Credit of Maine
Richard Lewis	Forest Resources Association
Wendy Gray	Gray Marketing
Henry Whittemore	Hancock Land Company
Neil Postalweit	Hancock Lumber
Dan Russell	Huber Engineered Woods
Peter Trandiffilou	Huber Resources
Dave Lieser	International Paper
Pat Flood	International Paper
Joel Swanton	International Paper
Phil Sullivan	Irving Forest Products
John Cole	Irving Woodlands
Josh Philbrook	Irving Woodlands
Lewis Hews	Irving Woodlands
Blake Brunsdon	J.D. Irving
Marcia McKeague	Katahdin Timberlands
Gary Bahlkow	LandVest Timberlands
Susan Aygarn	LandVest Timberlands
Terry Walters	Lavalley Lumber
Ian Johnstese	Louisiana Pacific
Charles Tardif	Maibec Industries, Inc.
Alec Giffen	Maine Forest Service
Tony Lyons	MeadWestvaco
Michelle Pelletier	Moosehead Cedar Log Homes
Dwain Allen	Moosehead Manufacturing
Paul Nadeau	Nadeau Logging
Fred Huntress	NEFCO
Peter Russell	P.R. Russell, Inc
Bill Miller	Prentis & Carslisle
Tim Beaulien	Prentis & Carslisle
Don White	Prentis & Carslisle
Catherine Jolliffe	Robbins Lumber
James Robbins	Robbins Lumber
Jim Robbins	Robbins Lumber
Ron Lovaglio	SAPPI
John Cashwell	Seven Islands Land Co.
Carl Henderson	Sewall Company

Individual	Company
Pat Sirois	Maine SFI
Stu Miller	Stratton Lumber
Luke Brochu	Stratton Lumber
Tom Doak	SWOAM
Clifton Foster	Timberstate G., Inc
Gregory Foster	Timberstate G., Inc
Dan Smith	Wagner Forest Management

Appendix G

Maine Wood Products Association

Meeting with Board of Directors

On July 28, 2004, Eric Kingsley of Innovative Natural Resource Solution LLC was invited to meet with the Board of Directors of the Maine Wood Products Association (MWPA) to discuss the Maine Future Forest Economy Project and how Maine government and industry might work together to foster a healthier industry. MWPA is a trade association that works with Maine wood product manufacturers.

As part of this meeting, participants were asked to list items that were existing challenges to wood product manufacturing in Maine, and to identify actions that industry or State government might take to help address these issues. The raw notes from that meeting are below.

Challenges:

- property tax (including tax on equipment)
- health insurance
- training for staff
- transport issues (1 way trucks, inability to deal w/ rail)
- employees willing to work in manufacturing
- work ethic (lost between generations)
- social welfare system

Actions Maine State Government Can Take:

- be more protectionist (log export)
- education in schools re forest and forest industry
- coordination of state and federal rules
- Maine based procurement ("buy local" for state projects)
- General state spending

Actions Maine Industry Can Take:

- branding – grassroots and top down
- educate consumers – why buy green
- centralized logistics for trucks
- group self-insurance
- Maine has good name recognition – capitalize on it
    - Example: furniture dealers asking that pieces have "Maine" on it, not New England

Maine Wood Product Association Meeting Participants

Individual	Company
Dan Maxham	W.A. Mitchell, Inc
Roger Johndro	Pleasant River Forestry Services
Don Woodruff	Mainmast, Ltd.
George Rafuse	Macdonald Page
Randall Comber	Moosehead Cedar Log Homes
John Wentworth	Moosehead Manufacturing Co.
Alan Chesney	Wells Wood Turning & Finishing
John Oliver	Brown Wood
Bob MacGregor	Maine Wood Products Association
Jeff Plourde	Peoples Heritage Bank

Appendix H

MAINE FOREST PRODUCTS INDUSTRY
Investment Survey (Pan Atlantic Consultants)

Name:	Phone:
Title:	Org:
Date:	

Key Objectives:

(1) Evaluate attitudes to and the level of propensity to finance companies in these sectors.

(2) Determine how Maine can best encourage investment in new technology within the forest products industry. (Private and public sector)

Introduction:

Thank you for taking part in our research about the investment climate in Maine's Forest Products industry. During our discussion, I will refer to the Maine Forest Products Industry as a collection of the following sectors:

- ✓ Pulp and paper mills
- ✓ Saw and planing mills
- ✓ Secondary wood products companies such as furniture, wood components manufacturers, etc.
- ✓ Wood composites manufacturers
- ✓ Biomass Energy Facilities
- ✓ Saw and Planing Mills
- ✓ Wood turning Mills
- ✓ Support Services: Trucking, Machining, etc.

1. Please describe your company and its industry/financial focus.

   i. What types of investments do you typically make? (VC, Loans, etc.)

2. What are your key criteria for selecting any type of investment opportunity?

3. Please describe your company's level of financing in the Forest Product sectors previously mentioned.

   i. Current level of funding

   ii. Past level of funding

4. Please identify which sectors you have specifically invested in:

   _____ Pulp and paper mills

   _____ Saw and planing mills

   _____ Secondary wood products companies such as furniture, wood components manufacturers, etc.

   _____ Wood composites manufacturers

   _____ Biomass Energy Facilities

   _____ Saw and Planing Mills

   _____ Wood turning Mills

   _____ Support Services: Trucking, Machining, etc.

5. Why have you invested in these sectors?

6. What is the historic performance (returns) that you have achieved by financing in these sectors?

   i. How do those returns compare to other investments in your portfolio?

ii. What other objectives do natural resource investments help you to achieve?

1. Do you have any unique criteria for choosing these investments?

iii. Which sectors have performed significantly better than others?

7. Please describe the most recent financing trends in Forest Products sectors.

8. What are the prevailing attitudes towards financing in Forest Products sectors?

i. Among members of your company?

ii. Among others in the financing industry?

9. How do you prioritize financing opportunities within Forest Products sectors?

i. How attractive are these opportunities compared to those in other sectors you commonly invest in?

ii. Which Forest Products sectors hold more promise than others?

iii. How important is the public/private nature of the deal?

10. What are the typical ROIs that can be expected in these sectors?

11. What is your current level of awareness of potential deals in these sectors?

    i. How do you keep abreast of financing opportunities in the natural resources (e.g. Forest Products) sectors?

    ii. How *would* you access information on potential investment opportunities in natural resources sectors?

12. What type of financial institution is most likely to invest in these forest products sectors?

13. Are there major deterrents to providing financing in these sectors?

14. Interest level: How likely are you to finance future deals in these sectors?

    i. Why or why not?

15. Let's talk about the potential for establishing an information clearing house on potential Forest Products deals:

    i. Would such a clearing house be useful to you?

    ii. In what ways?

    iii. How would you make use of it?

    iv. Are there other information clearinghouses (or similar services) that you use now? If so, what are they?

v. What information would you require in order to decide to review a potential deal in the Forest Products industry?

16. What actions can be taken by the state to stimulate investment in these sectors?:

i. By the forest products industry

ii. By relevant state agencies, such as the DOC, FAME, MTI, DECD, etc.

17. Should these actions vary by the type of investment?:

i. Public or Private Industry

ii. Specific sectors

18. Are you aware of industry models in other states (or countries) that would be applicable in Maine to stimulate greater investment in this sector?

19. Are there others in the investment, or forest products industry (financiers/experts) that you would recommend that we speak with?

Thank you for your help in this important initiative. Your information will be used to improve the prospects for Maine's natural resources industry and overall economy.

Appendix I

Interview Participants – Pan Atlantic Investor Interviews

The following individuals were interviewed by Pan Atlantic Consultants as part of that firm's research into the investment climate for Maine forest product manufacturers.

Name	Title	Company
John Williams	President	Maine Pulp and Paper Association
Bob MacGregor	Executive Director	Maine Wood Products Association
Philip Bibeau	Executive Director	Wood Products Manufacturers Association
Gordon Flint	Branch Manager	Androscoggin Savings Bank
John DeCamp III	Vice President, Commercial Lending Manager	Bangor Savings Bank
Jeanne Hulit	Vice President	Citizens Bank - Commercial Lending
Julie Beane	Resource Developer	Coastal Enterprises, Inc.
Jeff Barron	VP/Loan Officer	Farm Credit of Maine
Frederick Morton	Senior Vice President, Corporate Lending	Farm Credit of Maine
Matthew Senter	Vice President, Corporate Loan Officer	Farm Credit of Maine
Scott Kenney	Assistant Vice President, Corporate Loan Officer	Farm Credit of Maine
Stephen St. Pierre	VP, Relationship Manager	Key Bank - Presque Isle
Chris Fitzpatrick	Regional Vice President	Machias Savings Bank
Robert Harmon	President/CEO	Norway Savings Bank
Mike Kelly	VP, Forest Products	Peoples Heritage Bank
Timothy Nightingale	Senior Vice-President	United Kingfield Bank
J. Maurice Bisson	Principal and Coordinator, Forest Products Industry Group	Berry, Dunn, McNeill & Parker

Marty Grohman	President	Correct Building Products
John Osborne		Biomass Energy Resource Center
Scott Morrison	President	The Oliver Stores
Michael Short	Managing Director, Forest Products Group	John Hancock Financial Services, Inc.
Herb Haynes	Owner	HC Haynes
John Cashwell	President	Seven Islands Land Company
Bob Pinette	VP Woodlands Division	JD Irving
John Delahanty	Partner	Pierce Atwood LLP
John Witherspoon	President	FAME
Judy Albee	Owner	Tucker Mountain Log Homes
Kevin Hancock	President	Hancock Lumber
Jim Robbins	Owner	Robbins Lumber
Adrian Brochu	Owner	Stratton Lumber, Pleasant River Lumber
John Heisenbuttel	VP - Forest Resources	AF&PA (American Forest & Paper Association)
Patrick Strauch	Executive Director	Maine Forest Products Council
Steven Rohde	Director, Forest Futures Initiative	Northern Forest Center
Tom Howard	Government Relations	Domtar
Rosaire Pelletier	Group Controller	Frasier Paper
Rick Douglas	Controller	Georgia Pacific
Steve Clarkin	Government Relations	International Paper
Sarah Manchester	General Counsel, North America	SAPPI
Mark Kemp	President	Kemp Enterprises

Appendix J

Individuals Providing Input to the Maine Future Forest Economy Project[245]

The following individuals provided input to Innovative Natural Resource Solutions LLC during this project, through meetings, phone conversations, research assistance, completing surveys, public presentations or other means. INRS greatly appreciates the assistance these and other individuals have provided during the duration of this project, and regrets any omissions or misspellings.

Individual	Company Affiliation
Art Raymond	A.G. Raymond & Associates
Kathy Abusow	Abusow International, LTD.
Steven Lattanzio	Actuarial Solutions
Donna Reckart	Allegheny Wood Products, Inc.
John Heisenbuttel	American Forest & Paper Association
Michael Virga	American Forest & Paper Association
Brad Cort	Andritz, Inc.
Gordon Flint	Androscoggin Savings Bank
D. Craig Adair	APA - The Engineered Wood Association
Jack Merry	APA - The Engineered Wood Association
Thom Labrie	Auburn Enterprises LLC
John DeCamp III	Bangor Savings Bank
Jeanette Decker	Bear Hill Lumber Company
Thomas L. Beck	Beck Group (The)
Y. Leon Favreau	Bethel Furniture Stock
J. Maurice Bisson	Berry, Dunn, McNeill & Parker
John Osborne	Biomass Energy Resource Center
Kevin McKenin	Boralex - Fairfield
John Oliver	Brown Wood
Carolyn Rockwell	C & R Lumber Mill
Herschel Steen	Calley & Currier Company
Pauline Rochefort	Canadian Wood Council
Kent Holzer	Central MN Ethanol Co-op
Bob Chadbourn	Chadbourn Tree Farms
John Gray	Chadbourn Tree Farms
Jeanne Hulit	Citizens Bank - Commercial Lending
Bill Sylvester	Clayton Lake Woodlands
David Yocis	Coalition for Fair Lumber Trade
Julie Beane	Coastal Enterprises, Inc.
Bruce Hamilton	Cold Stream Lumber Company
Brian Doery	Competitive Edge Management
Richard Silkman	Competitive Energy Services

[245] Incomplete listing – some individuals requested anonymity, and not all team members fully tracked contacts.

Rick Handley	CONEG - NRBP
Marty Grohman	Correct Building Products
Pat Will	Co-Vista (Green Designs)
Alan W. Pearson	D.G Forest Products
Patrick McGowan	Department of Conservation
Karin Tilberg	Department of Conservation
Brian Dancause	Department of Economic & Community Development
Jack Cashman	Department of Economic & Community Development
Peggy Schaffer	Department of Economic & Community Development
John B. Wathen	Department of Environmental Protection
Dawn Gallagher	Department of Environmental Protection
Mark Cone	Department of Environmental Protection
Tim Bolton	Department of Transportation
Jo Ellen Force	Dept. of Forest Resources, University of Idaho
Keith Jacobson	Division of Forestry, MN Dept. of Nat. Res.
Deborah Feck	Domtar Industries
Scott Beal	Domtar Industries
Tom Howard	Domtar Industries
Edwin L. Mongan, III	DuPont (Energy & Environment)
Jeffrey Howe	Dovetail Partners
Chip Bessey	E.D. Bessey, Inc
John Armstrong	E.R. Palmer Lumber Co., Inc
John Ferland	E2 Tech Council / Center for Environmental Enterprise
Martin Wilk	Eaton Peabody
Ed Holt	Ed Holt & Associates
Martin Glass	EMGE & Co.
Kevin King	Empire State Forest Products Association
Esteban Chornet	Enerkem Technologies
David C. Boulard	Ensyn Group, Inc.
Robert Pirraglia	Ensyn Group, Inc.
Gore Flynn	Enterprise Resources
Dan Sosland	Environment Northeast
Norman Gridley	Environmental & Energy Technology Council of Maine
Steven Winnett	Environmental Protection Agency
Anna Giovinetto	Evolution Markets LLC
Field Ryder	FAME
John Witherspoon	FAME
Frederick Morton	Farm Credit of Maine
Jeff Baron	Farm Credit of Maine
Matthew Senter	Farm Credit of Maine
Scott Kenney	Farm Credit of Maine
Charlie Spies	Finance Authority of Maine
R.P. Field Ryder	Finance Authority of Maine
John Wissmann	Fisher International
Steven Ruddell	Forest Industry Services, BVQI North America
Ken Grant	Forest Product Technologies, Inc.
Patrick Hackley	Forest Resources Association

Richard Lewis	Forest Resources Association
Roger Dower	Forest Stewardship Council, US
Francois Julien	Forintek Canada Corp.
Donald Tardie	Fraser Papers
Fred O. Smith	Fred O. Smith Manufacturing Company
Mike Curtis	Georgia Pacific
Jim Tibbits	Georgia Pacific
Rick Douglas	Georgia Pacific
Peter Fusaro	Global Change Associates
Paul Randall	Gov. Sustainability Council
Wendy Gray	Gray Marketing
Scott Hersey	Greenville Steam Company
Richard Willey	Guilford Transportation
Henry Whittemore	Hancock Land Company
Kevin Hancock	Hancock Lumber
Neil Postalweit	Hancock Lumber
Ron Bugeau	Hancock Lumber
George Barrrett	Hardwood Lumber Review
Herb Haynes	HC Haynes
Ken Briggs	HDR, Inc.
Burley Higgins	Higgins Lumber Mill
Walter Maheux	Hillside Lumber
Mary Frye	Home Furnishings International Association
Bill Houghton	Houghton Cedar, Inc.
Dan Russell	Huber Engineered Woods
James Reed	Huber Engineered Woods
Peter Trandiffilou	Huber Resources
Mark R. Hurd	Hurd Lumber
David Wilby	Independent Energy Producers of Maine
David Wilby	Independent Energy Producers of Maine
Burnell Fischer	Indiana Division of Forestry
Leland Crawford	International Paper Company
Steve Clarkin	International Paper Company
Dave Lieser	International Paper Company
Joel Swanton	International Paper Company
Mike Craft	International Paper Company
Dennis Castonguay	International Paper Company
Pat Flood	International Paper Company
Sharon Haines	International Paper Company
Lloyd Irland	Irland Group (The)
K. Hynes	Irving Forest Products
Phil Sullivan	Irving Forest Products
Blake Brunsdon	Irving Woodlands
Hugh Crammond	Irving Woodlands
John Cole	Irving Woodlands
Josh Philbrook	Irving Woodlands
Lewis Hews	Irving Woodlands

Bruce Bornstein	Isaacson Lumber
Bob Pinette	J.D. Irving
Dan Russell	J.M. Huber
Fritz Brayton	Jewett-Cameron Lumber Company
Michael Short	John Hancock Financial Services, Inc.
Dick Arnold	Katahdin Paper
Glenn Savaeur	Katahdin Paper
Rosaire Pelletier	Katahdin Paper
Marcia McKeague	Katahdin Timberlands LLC
Mark Kemp	Kemp Enterprises
Denis Carrier	Kennebec Lumber Compnay
Stephen St. Pierre	Key Bank - Presque Isle
John Robinson	Knight-Celotex
Chris Ridley-Thomas	KPMG Performance Registrar, Inc.
Allie McCormack	Kraft, Taylor and McCormack
David Campi	Land's End
Gary Bahlkow	LandVest Timberlands
Susan Aygarn	LandVest Timberlands
Terry Walters	Lavalley Lumber
Scott Lawson	Lawson Group
Leonard Guss	Leonard Guss & Associates
John Oliver	L.L. Bean
Ian Johnstone	Louisiana Pacific
Richard Vlosky	Louisiana State University
George Rafuse	MacDonald Page
Chris Fitzpatrick	Machias Savings Bank
Eddie Cowan	Madison Paper Industries
Russell Drechsel	Madison Paper Industries
Bruce McLean	MAGIC
Jerry Tudan	MAGIC (consultant)
Charles Tardif	Maibec Industries, Inc.
Mark Cone	Maine Department of Environmental Protection
Vanessa Santarelli	Maine Department of Labor
Patrick Strauch	Maine Forest Products Council
Patrick Sirois	Maine Forest Products Council
Cory Crocker	Maine International Trace Center
Corey Crocker	Maine International Trade Center
Beth Nagusky	Maine Office of Energy Independence
Faith Huntington	Maine Public Utilities Commission
Mitch Tannenbaum	Maine Public Utilities Commission
John Williams	Maine Pulp & Paper Association
Michael Barden	Maine Pulp & Paper Association
Carla Prescott	Maine Revenue Services
Michael Montoya	Maine State Planning Office
Troy Jackson	Maine State Representative
Bruce Bryant	Maine State Senator
John Martin	Maine State Senator

Bob McGregor	Maine Wood Products Association
Christine Krauss	Maine WoodNet
Don Woodruff	Mainemast, Ltd.
Nils Bolgen	Massachusetts Technology Collaborative
Rob Elder	Maine DOT, Office of Freight Transportation
Irene Kowalczyk	MeadWestvaco Corporation
Joseph Lawson	MeadWestvaco Corporation
Gary Curtis	MeadWestvaco Corporation
Tony Lyons	MeadWestvaco Corporation
Kevin Korpi	Michigan Forest Products Council
G. Stephen Taylor	Mississippi State University
Sam Prather	Moose Creek Log Homes
C. Charles Lumbert	Moose River Lumber Co., Inc.
Michelle Pelletier	Moosehead Cedar Log Homes
Randall Comber	Moosehead Cedar Log Homes
Dwain Allen	Moosehead Manufacturing
John Wentworth	Moosehead Manufacturing Company
Carl Bjornberg	Myllykoski Corporation
Paul Nadeau	Nadeau Logging
William Horvarth	National Association of Conservation Districts
Dorothy Coleman	National Association of Manufacturers
Andrew Spahn	National Association of Regulatory Utility Commissioners
Tom Williams	National Renewable Energy Laboratory
Cindy Riley	National Renewable Energy Laboratory
Ed Hogan	Natural Resources Canada
Nick Brown	NatureServe
Fred Huntress	NEFCO
Scott Brown	New Energy Capital LLC
John Hamilton	NH Community Loan Fund
Jasen Stock	NH Timberland Owners Association
Doug Baston	North by Northeast
Bob Slocum	North Carolina Forestry Association
Urs Buehlmann	North Carolina State University
Rick Handley	Northeast Regional Biomass Program
Steve Blackmer	Northern Forest Center
Steven Rohde	Northern Forest Center
Robert Harmon	Norway Savings Bank
Tyler Elm	Office Depot (Environmental Affairs)
Scott Morrison	Oliver Stores (The)
Eric Hansen	Oregon State University
Peter Russell	P.R. Russell, Inc
Dan Shell	Panel World Magazine
George O'Brien	PaperAge Magazine
Jeff Parker	Parker Lumber Company
George Bald	Pease (NH) Development Authority
Jeff Plourde	Peoples Heritage Bank
Mike Kelly	Peoples Heritage Bank

Maurice PePin	PePin Lumber
Tony Buxton	Perti Flaherty
John Delahanty	Pierce Atwood LLP
David Flanagan	Pine Tree Products
Neal Cormany	Pinnacle Group (The)
Roger Johndro	Pleasant River Forestry Services
Kenneth Lavoie	Pleasant River Lumber Company
Peter Russell	PR Russell
Larry Philbrick	Prentis & Carlisle
Bill Miller	Prentis & Carslisle
Don White	Prentis & Carslisle
Tim Beaulien	Prentis & Carslisle
Tony Buxton	Preti Flaherty
Greg Moore	Pride Manufacturing
Scott Taylor	Pride Manufacturing
Ben Gunneberg	Programme for the Endorsement of Forest Certification Schemes
Kelly Ferguson	Pulp & Paper Magazine
Elwood Lowell	R.E. Lowell Lumber Co.
Kermit Schott	Red Mill (The)
Al Schuler	Research Economist, USDA Forest Service, WV
John Maine	RISI / PaperLoop
Rodney Young	RISI / PaperLoop
Scott Christiansen	River Valley Growth Council
Norman MacIntyre	River Valley Technology Center
Catherine Jolliffe	Robbins Lumber, Inc.
Jim Robbins, Jr.	Robbins Lumber, Inc.
Jim Robbins, Sr.	Robbins Lumber, Inc.
Bill Rockwell	Rockwell Industries
Ford Reiche	Safe Handling, Inc.
John Wolanski	Safe Handling, Inc.
Paul Turina	Safe Handling, Inc.
John Maris	SAPPI
Ron Lovaglio	SAPPI
Sarah Manchester	SAPPI
Pete Howland	Saunders Brothers
Lee Bingham	SCA North America
Cedric Wilkins	Scottish Industries
John Cashwell	Seven Islands Land Company
John McNulty	Seven Islands Land Company
Carl Henderson	Sewall Company
Tom Doak	Small Woodland Owners Association of Maine
Michael Grogen	Society of American Foresters
Byron Chute	Songo Timber Products
Guy Sabin	South Carolina Forestry Association
Mark Buckley	Staples, Inc.
Galen Rose	State Planning Office
Michael Montagna	State Planning Office

Luke Brochu	Stratton Lumber
Stu Miller	Stratton Lumber
Adrian Brochu	Stratton Lumber, Pleasant River Lumber
William Banzhaf	Sustainable Forestry Initiative
Pat Sirois	Sustainable Forestry Initiative (Maine)
Gregory Janetos	Sustainable Forestry Management, Ltd
David Tardif	Tardif Sawmill
John Fuitak	Thomas Moser Cabinets
David Refkin	TI Paperco
Rich Donnell	Timber Processing Magazine
Clifton Foster	Timberstate G., Inc
Gregory Foster	Timberstate G., Inc
John Simko	Town of Greenville
Judy Albee	Tucker Mountain Log Homes
Thanos Theodoropoulos	U.S. Census Bureau, Economic Census Division
Habib Dagher	UMO Advanced Engineered Wood Composite Center
Stephen Shaler	UMO Advanced Engineered Wood Composite Center
Michael Bilodeau	UMO Pulp & Paper Process Development Center
Deborah Donovan	Union of Concerned Scientists
Timothy Nightingale	United Kingfield Bank
John Genco	University of Maine
Adriaan van Heiningen	University of Maine
David Field	University of Maine
Hemet Pendse`	University of Maine
Brian Brashaw	University of Minnesota
Mark Lapping	University of Southern Maine
Valarie Lamont	University of Southern Maine, Center for Entrepreneurship and Small Business
Henry Spelter	USDA Forest Products Lab
Peter Ince	USDA Forest Products Lab
Bill von Segen	USDA FS Oregon
Stephen Bratkovich	USDA FS SPF, Ohio State
Jim Reeb	USFS Extension person, OR
Tyler Riggs	Virginia Tech Center for Forest Products Marketing and Management
Dan Maxham	W.A. Mitchell, Inc.
John Tweedale	WA state, DNR
Dan Smith	Wagner Forest Management
Alan Chesney	Wells Wood Turning & Finishing, Inc.
Cinda Francis	West Virginia Forestry Association
Delmar Raymnond	Weyerhauser
Bill Carlson	Wheelabrator Environmental Systems, Inc.
William Day	William Day & Sons
Terry Mace	Wisconsin Department of Natural Resources
Patrick Schillinger	Wisconsin Paper Council
Scott Leavengood	Wood Products Extension Agent, OSU
Philip Bibeau	Wood Products Manufacturers Association
Morrill Worcester	Worcester Energy Co., Inc.

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