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EXECUTIVE SUMMARY

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.ⁱ

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.”ⁱⁱ

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 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 ariseⁱⁱⁱ.

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.
 - Given the fact that an aggressive RPS would raise electric rates for all customers, this is not a recommendation to establish an aggressive RPS;
 - 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.

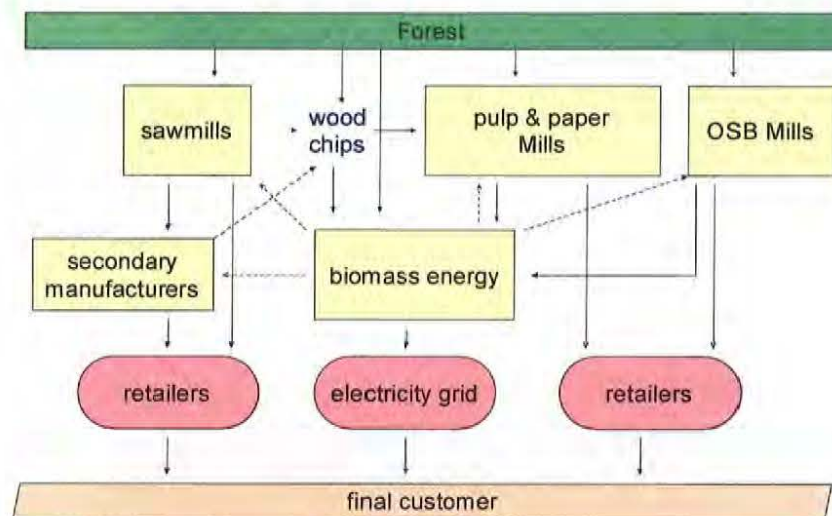
Maine's Forest Industry Cluster

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.



Figure A. Simplified Flow Chart of Maine Forest Products Industry Cluster



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* report 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. Figures B and C show how Maine's forest industry employment has declined while average wages in forest products manufacturing have increased.

Figure B. Maine Forest Industry Employment – Paper, Solid Wood and Forestry & Logging, 1992 - 2003^{iv}

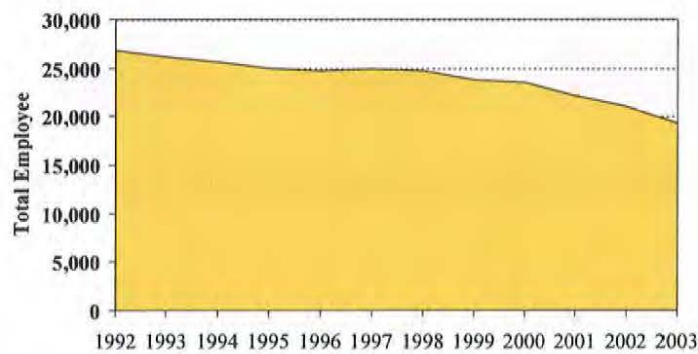
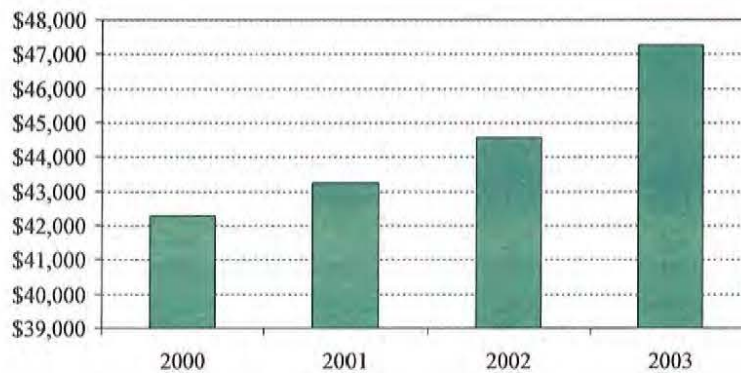
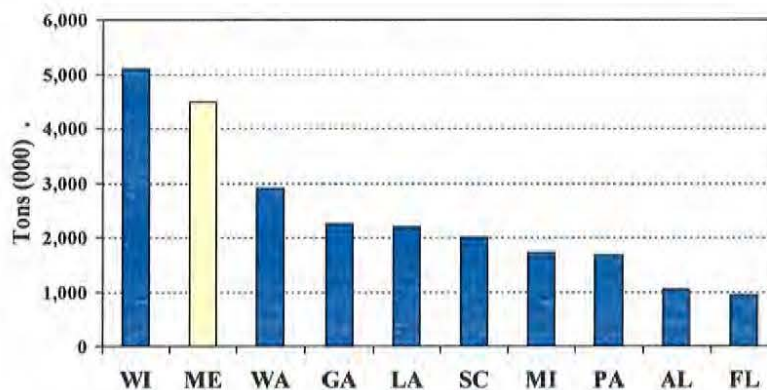


Figure C. Average Wages, Maine Paper Mill and Sawmill Employees, 2000 - 2003^v



- 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.

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



Data Source: American Forest & Paper Association

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.

The competitive position of Maine paper mills varies by grade. Figure E shows the weighted average cash cost for production of coated freesheet. For this grade, Maine mills compare well to facilities in a number of other geographic areas.



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

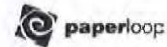
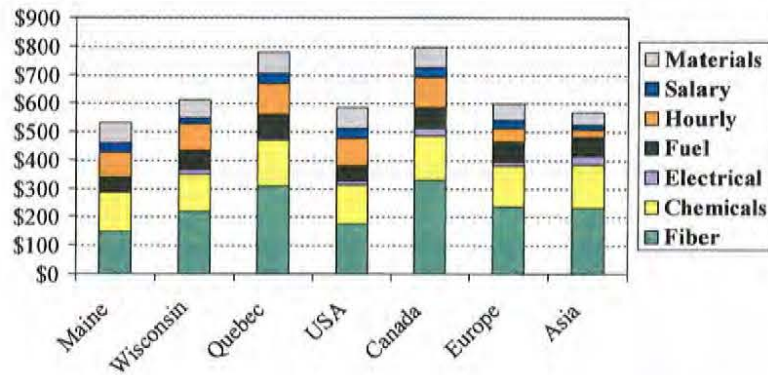
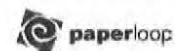
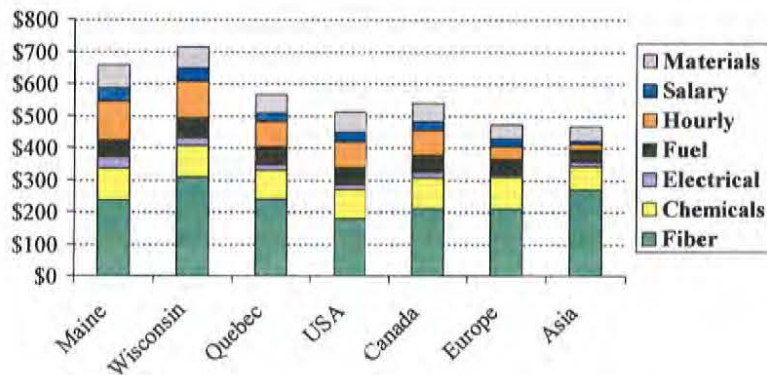


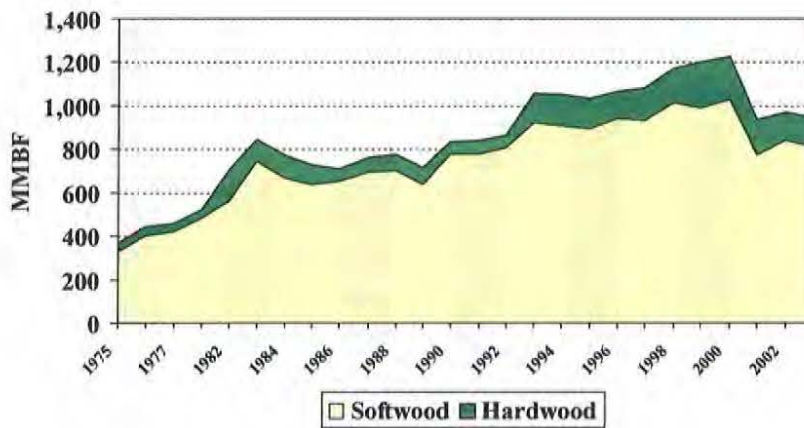
Figure F shows similar information for uncoated freesheet. For this grade, Maine mills are not as competitive against a number of other geographic regions.

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



- **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.

Figure G. Maine Lumber Production, 1975 - 2002

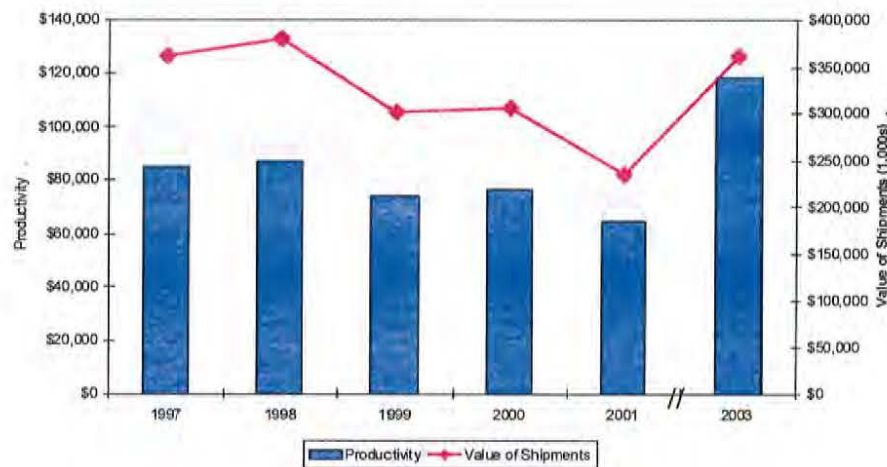


Data Source: U.S. Department of Commerce, Census Division



- **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.

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

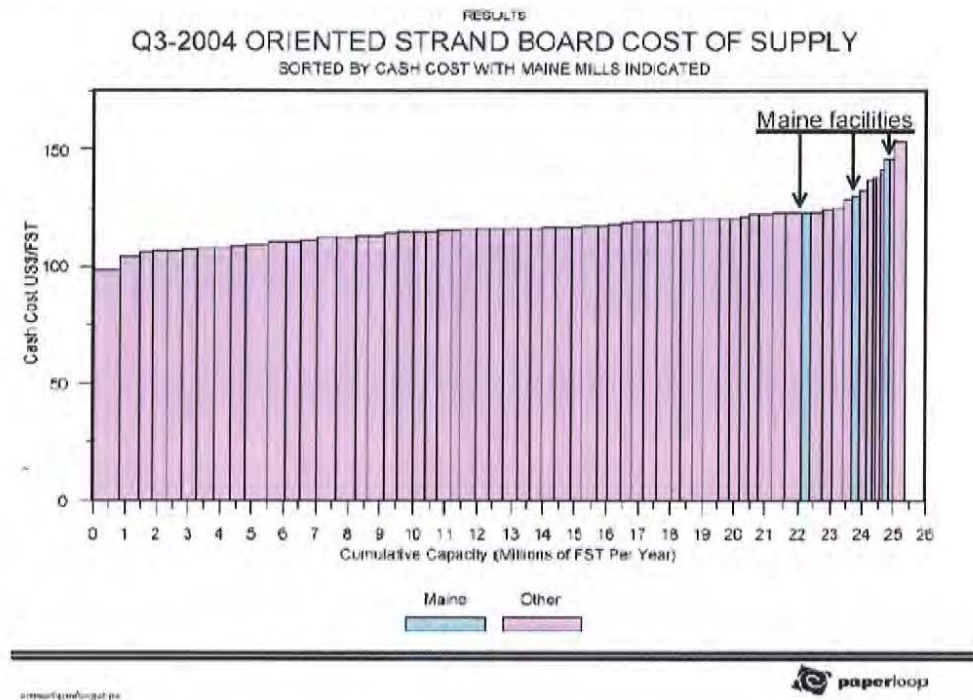


Data Sources: U.S. Census Bureau and Maine Department of Labor

- 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.



Figure I. North American Cost Curve, Oriented Strand Board^{vi, vii}



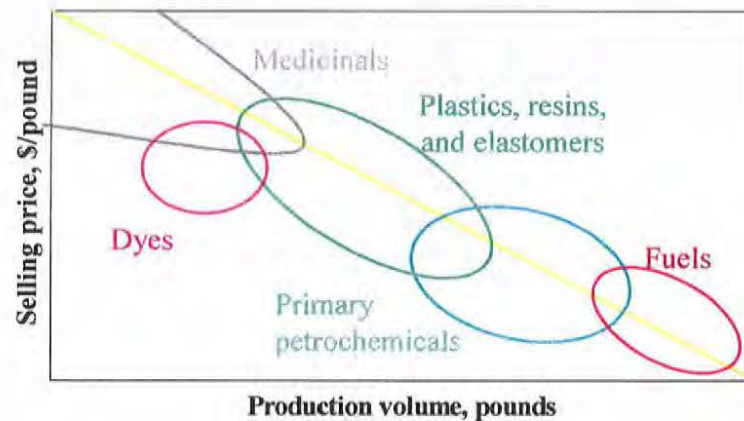
For newer, emerging engineered products, the *AEWC Center at the University of Maine* is a world-class research institute that is developing new applications and uses for wood. Some of the advancements from this facility are quite promising, and at least one thriving Maine business has already come from research conducted at the AEW 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.

Figure J. Selling price and market volume of bio-products^{viii}



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
<ul style="list-style-type: none"> • Coated Groundwood <ul style="list-style-type: none"> ➤ Used in high-end magazines, catalogues, and newspaper inserts ➤ Produced at Madawaska, Jay, Bucksport and Rumford • Uncoated Groundwood <ul style="list-style-type: none"> ➤ Directory and supercalendared grades ➤ Produced at Madawaska, East Millinocket, Millinocket and Madison 	<ul style="list-style-type: none"> • 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 • 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 	<ul style="list-style-type: none"> • 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 • 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 	<ul style="list-style-type: none"> • Investment in productivity improvements • Change Maine tax structure to encourage large capital investment • Investment in productivity improvements • Change Maine tax structure to encourage large capital investment

Product	Opportunities	Challenges	Product-Specific Action Priorities
Paper			
<ul style="list-style-type: none"> • Coated Freesheet <ul style="list-style-type: none"> ➢ Uses include high-end magazines, catalogues, brochures, and direct mail ➢ Produced at Jay, Rumford, and Skowhegan 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • New, low-cost production coming on-line globally more than double Maine's capacity • Two machines at Maine mills noticeably higher cost 	<ul style="list-style-type: none"> • Investment in productivity improvements • Change Maine tax structure to encourage large capital investment
<ul style="list-style-type: none"> • Uncoated Freesheet <ul style="list-style-type: none"> ➢ Uses include business applications, copy paper, commercial printing and envelopes ➢ Produced at Jay, Madawaska, Woodland 	<ul style="list-style-type: none"> • Very modest demand growth expected, though lower than growth in GDP 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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			
<ul style="list-style-type: none"> • Hardwood Lumber <ul style="list-style-type: none"> ➢ Uses include pallets, furniture, flooring and millwork ➢ Produced at over 100 sawmills statewide 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • North American use of hardwood for pallets and furniture declining • Significant resource competition from Canadian manufacturers 	<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Softwood Lumber (structural) <ul style="list-style-type: none"> ➢ Used in construction, primarily “2x” lumber ➢ Produced at 5 major sawmills statewide, and a number of smaller mills 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • White Pine <ul style="list-style-type: none"> ➢ Uses include millwork, windows and doors, furniture and flooring ➢ Produced at roughly 100 sawmills statewide 	<ul style="list-style-type: none"> • Market demand strong and anticipated to grow • New England region preferred by lumber purchasers • Sector has been making investments in capacity and productivity 	<ul style="list-style-type: none"> • Anticipated capacity growth larger in regions outside New England (percentage basis) • Competition from offshore species growing • Significant resource competition from Canadian manufacturers 	<ul style="list-style-type: none"> • 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			
<ul style="list-style-type: none"> • Furniture <ul style="list-style-type: none"> ➢ Roughly ten major facilities, and many smaller firms 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Develop marketing campaign that distinguishes Maine forest products • Develop public-private partnership to encourage shared training and improved operations management
<ul style="list-style-type: none"> • Turned Products <ul style="list-style-type: none"> ➢ Products include dowels, golf tees, and furniture parts ➢ Produced at five major facilities in Maine, several smaller facilities 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Competition from offshore manufacturers increasing dramatically • A number of large turning business have closed in recent years • Labor costs 	<ul style="list-style-type: none"> • Develop marketing campaign that distinguishes Maine forest products • Investment in productivity improvements • Change Maine tax structure to encourage capital investment
<ul style="list-style-type: none"> • Micro-Businesses 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Oriented Strand Board <ul style="list-style-type: none"> ➢ A structural panel whose applications include exterior walls and flooring ➢ Produced in Limerick, Easton, Woodland (idle) • Emerging Engineered and Composite Wood Products 	<ul style="list-style-type: none"> • North American demand expected to grow • Individual companies have made strategic investments in developing niche markets and in productivity • AEW Center at University of Maine a world-class research institution in development of new wood composite products 	<ul style="list-style-type: none"> • 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. • New products must penetrate existing markets, and may have challenges associated with managing growth 	<ul style="list-style-type: none"> • 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 • 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 <ul style="list-style-type: none"> ➤ Electricity produced through combustion of wood residue ➤ Ten stand-alone facilities producing power for the electricity grid, many others associated with manufacturing facilities 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • For most existing facilities, major new investment in boiler or emissions control is necessary to participate in regional renewable energy markets
Bio-Based Products	<ul style="list-style-type: none"> • Nationally, the paper industry has recognized the potential for bio-products to provide additional revenue • Older facilities <i>may</i> 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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^{ix};**
- **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.

Appendix A

Maine Future Forest Economy Project **Contents of Full Report**

In the full text of the *Maine Future Forest Economy Project*, the following chapters contain detailed analysis of each identified subject, including a number of tables or figures to help the reader better understand the challenges and opportunities facing Maine's forest products manufacturing industry.

Project Summary

Current Position and Challenges Facing Maine Forest Product

Manufacturing

- Maine Forest Industry – An Overview
- Maine's Forest Products Cluster
- Pulp & Paper Sector
- Sawmills & Wood Product Manufacturing
 - Softwood Lumber
 - Hardwood Lumber
 - Secondary Wood Products
- Engineered Wood Products
- Biomass Electricity
- Bio-based Products

Survey of Maine Forest Product Manufacturers

Micro-businesses in the Maine Forest Product Manufacturing Sector

- Survey of Maine Forest Micro-businesses

Maine's Business Climate

Transportation of Maine Forest Products

Fostering an Entrepreneurial Climate in Maine's Forest Industry

Emerging Opportunities

- Role of Certification
- Carbon Markets

State Initiatives to Support & Grow Forest Product Manufacturing

Branding Maine Forest Products (by Robert Bush)

Maine's Forest Resources (by the Maine Forest Service)

Interviews with Investors and Financial Professionals (by Pan Atlantic Consultants)

Results of Public Survey (by Strategic Marketing Services)

Recommendations for Action



Appendix B Recommendations

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^x. Given the importance of forest products 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^{xi}:

- 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 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:

- Identifying and addressing public concerns as early as possible;
- Stakeholder agreement on a desirable outcome and reasonable timetables;
- Voluntary industry action to address issues of concern; and
- 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^{xii}.

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 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 AEW 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 AEW Center has enjoyed some success in moving new developments to the marketplace. However, there is clearly potential for more. AEW 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 AEW-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 AEW 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 AEW 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 AEW 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^{xiii} 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 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 NO_x 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^{xiv}. 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.

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^{xv}, 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 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^{xvi}. 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^{xvii} 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.

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.^{xviii}

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, 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^{xix}, 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.

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^{xx}, 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."^{xxi}

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:

- 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."^{xxii}

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
- 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^{xxiii}. 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.

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.



Endnotes

- ⁱ 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.
- ⁱⁱ Maine Department of Conservation. *Request for Proposals: Maine Future Forest Economy Project*. October 3, 2003.
- ⁱⁱⁱ A full discussion of each recommendation follows in Appendix B.
- ^{iv} Maine Department of Labor Data: NAICS Code 321 (wood product manufacturing), NAICS Code 322 (paper manufacturing), and NAICS Code 113 (forestry and logging).
- ^v Maine Department of Labor Data: NAICS Code 321 (wood product manufacturing) and NAICS Code 322 (paper manufacturing).
- ^{vi} 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. 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.
- ^{vii} The full report also contains a number of cost curves for paper grades produced in Maine, providing detail on their position in the North American and global marketplace.
- ^{viii} Overend, Ralph P. "Biobased Products from Biomass Platforms." *Forum on Bio-Products Development: Opportunities for the Forest Products Industry*. March 2, 2004.
- ^{ix} Due to answers of "don't know" and "neither agree nor disagree", figures do not total to 100%.
- ^x Ewing Marion Kauffman Foundation. *Promoting and Supporting an Entrepreneurship -Based Economy in Maine*. December 20, 2002.
- ^{xi} 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.
- ^{xii} This is also a recommendation of the Legislative Task Force to Increase Primary and Secondary Forest Product Manufacturing, May 1999.
- ^{xiii} These institutions include the University of Maine, the River Valley Growth Council, and the Maine Technology Institute.
- ^{xiv} 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.
- ^{xv} 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.
- ^{xvi} 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.
- ^{xvii} For example, the Appalachian Hardwood Council and the Southern Pine Council's regional promotional efforts.
- ^{xviii} This is similar to a recommendation of the Legislative Task Force to Increase Primary and Secondary Forest Product Manufacturing, May 1999.
- ^{xix} Depending upon the programs, this refers largely to the Maine Forest Products Council, the Maine Wood Products Association, and the Maine Pulp & Paper Association.
- ^{xx} In Canada, the largest allowable gross weight limit is 138,000 pounds.
- ^{xxi} 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.
- ^{xxii} 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.
- ^{xxiii} <http://www.dirigohealth.maine.gov/> accessed October 3, 2004.

