

Strategic Recommendations—Business Innovation

Forest Industry—next generation

The wood basket of the Northern Forest represents a huge economic opportunity, with potential significant increases in demand for timber. If the harvesting is not managed sustainably this opportunity represents a threat to the landscape.

1. Renewable energy

- ✓ Biofuels and bio-refineries: New York and Maine are investing significantly in R&D through SUNY and UME and beginning to support commercialization of converting wood into ethanol for fuel. NH also has a promising company in this field.
- ✓ We already are putting wood (chip) heat into schools in VT—why not ME, NH and NY?
- ✓ “Maine is already energy self-sufficient and NH and VT are not. (NY?). Should energy self sufficiency be a strategic target for the NF region?”

2. Innovative wood products

- ✓ All four states are investing in R&D to create wood composites and even plastics from wood

Strategic Recommendations—Business Innovation, cont...

Forest Industry—next generation, continued...

3. Commercialization capability development

- ✓ As the R&D efforts continue to grow, there is a growing need for the capacity to link business investors with entrepreneurs and the opportunities in the market
- ✓ **Example:** Old Town, Maine—conversion of the closed Georgia Pacific pulp and paper mill into a biomass energy facility—(see detail, below)
- ✓ **Example:** Business incubators—Mt. Washington Valley Economic Council Tech Village and Dartmouth Regional Tech Center created with the support of the NCC, the state of NH and Dartmouth and private investors

4. Carbon trading

- ✓ As the global carbon market continues to grow and mature, given our NF capacity for sequestration, we need to consider the carbon market potential and mechanisms for the Northern Forest. Example, the Global Carbon Market Fair and Conference, Cologne, Germany, May 2-4, 2007. Organized by the International Emissions Trading Association and the World Bank Carbon Finance Division.
- ✓ Research needed:
What are the CO₂ trade-offs among wood/biofuels, oil, natural gas?
What is the economic potential of the Northern Forest in the Carbon Market?
Other?

Strategic Recommendations—Business Innovation, cont...

Agriculture

The re-development of local agriculture, on sustainable principles, which also will serve local markets is an opportunity for community and economic development with a working landscape. Examples:

- ✓ **Greenhouse Tomatoes**, Madison, Maine—state of the art technology, revitalization of agriculture—12 months--job creation and renewable energy as a source of heat (see below).

- ✓ **The Intervale Center** supports financially viable and environmentally sustainable agriculture. We manage 354 acres of farmland, nursery, trails, wildlife corridors and compost production along the Winooski River in Burlington, Vermont, and we share what we do and what we learn with others around the state and throughout the world. **Our Mission is** to develop farm-and land-based enterprises that generate economic and social opportunity while protecting natural resources.

Regional Business Network Strategy—feedback from interviewees

- **Business owners/managers** are satisfied with their current memberships in organizations such as regional economic councils, state chambers of commerce and national industry associations.
- **Leaders of economic councils and state chambers** are interested in building NF regional collaborations for the purpose of lobbying state and federal governments. See below.
- **Leaders in State Universities, either general administration, or R&D**, are interested in collaborating on R&D to share and build knowledge, attract bigger grants and have critical mass to interface with commercialization opportunities. See below.

Business Network/ Regional Institution Building Strategic Options—some in progress, some still on the drawing board

1. R&D Wood Products collaboration among the State Universities of the four states.

Purpose

Shared knowledge, larger grants for larger, collaborative, more impactful projects and basis for downstream commercialization and exploration of partnerships with businesses and entrepreneurs and investors.

Status

Exploratory discussions are underway among SUNY, College of Environmental Science and Forestry; UVM, Rubinstein School of Environment and Natural Resources; UNH, Material Science Program; UME, Advanced Engineering Wood Composite Laboratory

2. Chambers of Commerce collaboration among the four states and New England

Purpose

Shared lobbying of state capitals and federal government on a shared, focus agenda of sustainable economic development for the rural economies of the NF. Potential initial focal area: forest products industry/ next generation—Wood to energy (biofuels/biorefineries) and Wood to green chemicals, composites and plastics. Potential interface with the R&D collaboration among the four state universities—see above.

Status

Exploration underway with expressed interest from NH Business Industry Association and New England Council of Business. Maine, Vermont and NY Chambers have not yet weighed in.

Business Network/ Regional Institution Building Ideas—some in progress, some still on the drawing board, continued...

3. Regional Economic Development Councils network

Examples of Councils

Aroostook Partnership for Progress, ATP, ME; Mt. Washington Valley Economic Council and Tech Village, NH; Colebrook Development Corporation, NH

Purpose

Share practices,
Develop a regional incubator network

Share marketing of the NF region to prospective incoming businesses; e.g. target-Canada and Europe (potential link to marketing NF eco and heritage tourism to Europe and other foreign markets)

Status

Expressed interest from Mt. Washington Valley Economic Council Tech Village, particularly in developing a network of incubators across the region, also at the interface with R&D developments.

4. NF Venture Capital Network

Purpose

For investors across the region to be able to identify promising new ventures, R&D and entrepreneurs, particularly with a focus on the future of the forest industry, across the region and pool resources to catalyze the creation of significant new enterprises.

Status

Drawing board

Business Network/ Regional Institution Building Ideas—some in progress, some still on the drawing board, continued...

5. NF Energy Collaborative

Purpose

Bridge and leverage existing state initiatives, e.g. VT Rural Energy Council for the development of a regional NF sustainable, renewable and self reliant energy policy.

Energy from renewable sources is embraced by the four governors. NY is already member of the national 25/25 Coalition (25% energy in the state from renewable sources by 2025). Lynch and Douglas endorse the 25/25 goal. While Baldacci does not mention 25/25, the Maine Brookings report addresses energy and industry development in a similar spirit.

Status: Drawing board

6. NF Eco-monitoring network

Purpose

In the face of various pressures and threats to the Northern Forest landscape, including climate change, new demands for wood products, population growth, fragmentation, invasive species, etc. to establish an ongoing feedback loop regarding the eco-health of our forested region. This would include the trees, the water, soil, biodiversity, air, pollinators, etc.

The ongoing monitoring can serve as input for policy measures for prevention and remediation; as well as input to new business development in the area that VT calls environmental engineering.

Status: drawing board

Appendices

**Need to develop strategic, quantifiable goals
(e.g. investment, jobs, revenue, etc.)**

- **Renewable energy**
- **Innovative wood products**
- **Commercialization capability development**
- **Carbon sequestration and trading**
- **Local, sustainable agriculture**

Next Generation Forest Industry Cluster Concepts

An industry cluster may be defined as geographically contiguous businesses who are suppliers and customers of one another, frequently vertically integrated. For example:

- Logging companies harvest sustainably and sell their product to the mill, which may be pulp and paper mill, saw mill and/or (soon) a bio-refinery
- The paper mill sells its products to market near and far.
- The saw mill sells its products to markets near (e.g. furniture manufacturers) and far (globally)
- The competitive mills are all using the latest technology and are competing on innovation and value for money.
- Note: Gov. Baldacci is investing \$8 million to support cluster development—in various industries.

**Helps and Hindrances doing business in the Northern Forest
General Factors**

Helps

- Quality of life
- The people are reliable employees
- Innovation is the key to the business success stories regardless of industry, including, for example, saw mills, paper mills, insurance, software, etc. and innovation is deep in the heritage and culture of the region.
- Self-reliance is deep in the culture and heritage, as well.
- NH favorable taxes
- Business support programs such as Maine's Pine Tree Development Zones which offer tax benefits and has been part of some of the latest business innovations such as Greenhouse Tomatoes (see below) and a conversion of a closed pulp and paper mill to a bio-refinery and related businesses (see below)

Hindrances

- Lack of affordable housing
- High property taxes
- Too many areas missing high speed broadband and cell phone coverage
- Difficulty in competing in the global economy. For example, China has come to dominate furniture manufacturing.
- Energy costs are high
- Perceptions that outsiders have that the region is a difficult place to do business with high taxes and poor transportation, with the exception perhaps of NH

**Helps and Hindrances doing business in the Northern Forest—
Forest Industry—Next Generation**

Helps

- Climate Change—creates a sense of urgency
- The Forest
- The heritage of working the forest—the know-how is here
- Good, skilled people
- The promising R&D activities being driven by State Governments and State Universities

Helps and Hindrances doing business in the Northern Forest—Forest Industry—Next Generation, cont....

Hindrances

- Climate Change—filled with unknowns and challenges—environmentally, socially and economically
- Energy: inability to move small percent of power from Maine Hydro into high priced market—competitive disadvantage. *Our transmission infrastructure is our weakest link*—multiple owners--group of thousands. Not been upgraded to match our demand for energy. Ongoing Washington Debates—recognized need—no one has solved it.
- Slow process of commercialization and the potential need of raising hundreds of millions of dollars, while other states and regions get to the market before we develop the industry.
- Takes time to establish partnerships among industry with community with environmentalists to assure understanding, buy-in and commitment to the development of the industry.
- Truck weight limits in Maine force logging trucks onto back roads
- Lack of consensus on standards for sustainable forestry among the spectrum of stakeholders.
- Environmental regulations can be costly and appear unnecessary sometimes; “e.g., cleaning up non-existent odor in a pulp mill”
- Too few young people entering the industry
- RGGI will cost me 1.5 million a year—big brick—extra power cost—that I have to pay to the generators—because some of them need to buy carbon credits. Hydro, nuclear and biomass-extra money in their pocket. Only way I can survive—if I can get that money back and invest in technology to buy less power
- Workers compensation is expensive
- We choose to provide health care insurance—also expensive
- Fuel and Electrical Energy is costly
- Property taxes are high
- OSHA is costly
- Storm water run off regulations

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Biomass energy/ bioconversion plants—a case example

Old Town, Maine. The former Georgia Pacific paper mill being converted to a bio-refinery (making ethanol from wood), employing technology developed by the University of Maine. Projections are for the **creation of 1000 jobs** in the area over the next two years. GP with its wood-chip facilities previously employed 459 people. The closed mill's new business park operations will help transform the area into a 21st century economic hub. **Pine Tree Development Zone economic tax incentives helped the businesses decide to locate in Old Town.**

Red Shield, which is made up of a group of private investors, is using the **biomass boiler to heat the facility and produce power to sell to the region's power grid. It plans to produce ethanol at the site.** Red Shield Environmental will develop and manage the site, financing the operation of the biomass boiler. Other companies will lease space from Red Shield.

The first residents of the business park will be: **Tamarack Energy**, a developer of renewable energy, who will serve as the engineering developer for the biomass boiler operation. **Hallowell International, LLC** of Bangor, a low-temperature heat-pump manufacturer, plans to continue to make residential heat pumps at their Bangor facility and commercial and industrial heaters in Old Town. Portland-based **Lamtec Inc.** makes peel-and-stick labels. Its goal is to hire 50 people the first year and employ 400 workers by the second year. Included in the sale were the four wood-chip facilities run by GP, which will provide additional feedstock.

In March, 2006 the **National Science Foundation** awarded UME \$6.9 million to fund the biorefinery research under an Experimental Program to Stimulate Competitive Research grant, or **EPSCoR**. The university tacked on a 50 percent matching fund, bringing the program's budget to **\$10.35 million over the next three years with the eventual goal of creating a biorefinery in Maine.**

"The existing biomass plant will be the central component. Over time we will bring in facilities such as an ethanol plant, a biodiesel plant, a bio-oil plant and a biogas plant. These plants use feedstocks, like wood, that come from the regional economy. So instead of shipping dollars outside the region that would stimulate jobs elsewhere, we will be able to keep those dollars here in the region."

"This is a leading edge project, and as an environmental project it's absolutely what we must do as a state and a nation," said Paslawski.

"This marks the first time a closed pulp and paper mill in Maine has been reused for new state-of-the-art production that will transition employment opportunities, create new industry and stabilize the employment and tax base of the community," said **Governor Baldacci.**

Jack Cashman of the Department of Economic and Community Development brought the new business park concept forward.

The Department of Economic and Community Development has been researching the viability of a biofuel, bio-refinery, renewable-energy, business-park facility for the past three years, seeking technological advice from the Rumford **Fractionation Development Center (FDC)**. The FDC is a Rumford-based organization promoting biomass conversion technologies and predicts that biofuel could eventually account for the majority of the fuel used in Maine annually. If the state followed the FDC blueprint, we would use 50 percent biofuels for fuel annually. The 18-month study was funded by the U.S. Department of Energy and the Maine Technology Institute. **The Center calls for construction of 50 bioconversion plants in the state during the next 15 to 20 years, paid for largely by private energy companies. Scott Christiansen, the center's executive director, said the Old Town site is the beginning.**

Additional biomass company examples in the NF region

1. **Mascoma, inc. Dartmouth incubator—**

Developers of cellulosic ethanol; awarded a \$20 million NY State contract to build a demonstration facility in Rochester, NY.

1. **Tethys Research LLC, Bangor**

Tethys is developing an enzyme-assisted pretreatment step for oxygen delignification to improve the yield and quality of cellulose from wood pulp while reducing the use of harsh chemicals. Tethys will work in cooperation with the Pulp and Paper Process Development Center at the University of Maine in Orono. The effect of the developed enzyme on the physical and chemical characteristics and on the subsequent oxygen delignification of wood pulp will be determined.

2. **Maine Biodiesel LP, Rumford**

Maine Biodiesel will fractionate crude tall oil using vacuum distillation and esterification, yielding biodiesels and sterols. MTI funding will help overcome process hurdles while designing and characterizing the material thermal balances and yields of an integrated and optimized process. Biodiesel LP is a partnership of the River Valley Technology Center, Enerkem Inc. and Frontier Energy.

3. **Maine Bioproducts, Rumford**

Maine Bioproducts will develop a high volume biorefinery to convert forest biomass into value-added fuel additives and chemicals. MTI funding will support the manufacturing process and development planning necessary to qualify a high volume levulinic acid biorefinery for financing and construction.

Companies approved to receive funds by the MTI board of directors but pending approval from the federal Department of Energy are:

Additional biomass company examples in the NF region

4. **Safe Handling Inc., Auburn**

Safe Handling will research and plan for a commercially viable biorefinery using emerging technologies to be tailored to biomass feedstock, predominantly forest bioproducts, producing energy, chemicals and high value derivative chemicals.

5. **NE Wood Pellet, Jaffrey, NH**

6. **Sprague Energy**

A Portsmouth, N.H., energy company that operates a fuel terminal in Rensselaer has been certified as a biodiesel provider by the National Biodiesel Board
Sprague is a wholly owned subsidiary of Axel Johnson, Inc, a Swedish company.

7. **Ensyn Co., Ontario**

A subsidiary of Ivanhoe, Corp. “Wood comes in and 200 tons of biofuel/oil comes out per day!”

Northern Forest Biomass Energy Initiative, Tim Maker, Exec. Dir.—Focus on Local Energy production

Goal: power generation on the customer premises—electricity and waste heat

Benefits:

- Offset fossil fuel
- Local low grade wood for local energy needs
- For heating; business model requires seasonality
- Local wood to energy to make power on community scale—less than one megawatt—not yet available!
- We already are putting wood (chip) heat into schools in VT—why not ME and NY?

Existing R&D and Commercialization Institutions—resources for innovative economic development

Examples (not a comprehensive list, yet)

1. **Maine Technology Institute**

The Maine Technology Institute “shall encourage, promote, stimulate and support research and development activity leading to the commercialization of new products and services in the State’s technology-intensive industrial sectors to enhance the competitive position of those sectors and increase the likelihood that one or more of the sectors will support clusters of industrial activity and to create jobs for Maine people.”

Maine’s Seven Targeted Technology Sectors

Advanced Technologies for Forestry & Agriculture

Aquaculture and Marine Technology

Biotechnology

Composite Materials Technology

Environmental Technology

Information Technology

Precision Manufacturing Technology

2. **Maine Fractionation Development Center**

The Fractionation Development Center is a non-profit organization that exists to identify, attract to Maine, and commercialize viable biomass-conversion technologies for the purpose of advancing energy security, economic activity, and sustainable resource use.

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Existing R&D and Commercialization Institutions—resources for innovative economic development

Examples (not a comprehensive list, yet), continued..

3. **University of Maine at Orono.**

Their biotech center recently received a \$10.35 million grant to conduct research on using wood to make ethanol, green plastics, industrial chemicals, and other products now made with oil. The three-year grant consists of \$6.9 million from the National Science Foundation and another \$3.45 million in matching money from the State of Maine.

4. **SUNY College of Environmental Sciences and Forestry**

Recently received a \$10 million grant for bio refining

ESF will work with Catalyst Renewable Corporation headquartered in Dallas, Tx., the engineering firm of O'Brien and Gere based in Syracuse, and New Energy Capital, one of the country's leading energy venture capital companies, to develop and construct a pilot commercial cellulosic ethanol facility in Lyonsdale, NY.

5. **Vermont Environmental Engineering**

The Agency of Commerce and Community Development will take the lead in marshalling public and private resources to build the engineering cluster. Environmental engineers work to identify and implement solutions to problems associated with ground and surface water contamination, air pollution, hazardous waste, toxic materials, contaminated sites, water supply, public health and safety, wastewater management, storm-water management and a variety of other challenges.

Why Vermont?

With the emergence of environmental engineering as a core industry sector we can more clearly and completely define the "Green Valley" of Vermont as the place where the world's environmental issues are addressed and market our expertise to the global economy.

Agricultural innovation—a case example

Greenhouse Tomatoes

Madison, Somerset County, Maine with their Madison Business Gateway Park had been looking for businesses.

US Functional Foods LLC is making the investment and Governor Baldacci designated 200 acres a Pine Tree Development Zone and plans to expand to 500 jobs and eight greenhouses by 2014.

Phase I: 24 acres of state of the art greenhouses, with the latest technology from Holland and without chemical pesticides, will create 60 new, full time jobs and represent a capital investment of \$20 million.

Earlier a \$400,000 Community Development Block Grant was awarded the town of Madison for public infrastructure support of economic development in preparation of the USFF opening.

The energy comes from hydro renewable sources at low rates since the produce their own energy (Madison Electric Works). Long term plans include a biomass co-generation facility that will make renewable electricity and the thermal by-product will be used to heat the greenhouses.

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Successful NF businesses across various industries all share *innovation* as a key to their success; Examples

Lincoln Paper and Tissue, LLC, Lincoln, Maine

Keith van Scotter, President; successful turnaround
Niche market for competitiveness

Wassau Paper Mill

Groveton, NH

David Atkinson, GM

Parent company invested in technology to produce paper in an added value niche market of colored papers, etc.

Maine Mutual Group

Larry Shaw, President

Mutual insurance; In business for 25 years

150 employees; 135 in Presque Isle; Sell through independent agents

F. A. Peabody Company

Insurance, Administration services and Wireless internet provider

Chris Anderson, President

Employees: 71

Maine only

Successful NF businesses across various industries all share *innovation* as a key to their success; Examples, continued...

Harden Furniture

McConnellsville, New York

Greg Harden, President

Founded in 1884

Vertically integrated

Own ten thousand acres; logging, saw mill, furniture manufacturing, marketing/sales/distribution

Saw mill: thirty people; Furniture factory: 400 people; total: 500 people

Compete on the high end; we customize

Allard Lumber

Brattleboro, Vermont

Cliff Allard, owner and President

Hard wood mill with adequate maple supply; no land ownership

Invested in technology improvements in recent years to remain competitive.

Industry Associations—Examples –a foundation for further networking

1. **VT Forest Products Association**
2. **Associated industries of VT**
3. **VT Woodland Association**
4. **VT Land Trust**
5. **VT Wood Manufacturers Association**
6. **VT Loggers Association**
7. **VT Consulting Foresters**
8. **Society of American Foresters**
9. **NH Business and Industry Association (chamber of commerce)**
10. **Maine Chamber of Commerce**
11. **Vermont Chamber of Commerce**
12. **Business Council of New York State (chamber of commerce)**
13. **New England Council (business and government lobbying the Federal government on issues of economic development and community well being)**
14. **Maine Forest Products Council (lobbying)**
15. **Cooperative Forestry Research Unit (land owners pool resources for research)**
16. **National Hardwood Manufacturers Association**
17. **Northeast Lumber Association**
18. **The American Forest & Paper Association (AF&PA)** is the national trade association of the forest, pulp, paper, paperboard, and wood products industry.
19. **Maine Master Logger Certification Program** (Maine is the first place in the world with a Master Logger program that offers third-party independent certification of logging companies' harvesting practices. The certification system is built around standards that have been cross-referenced to all of the world's major green certification systems.)
20. **The Trust to Conserve the Northeast Forestlands (The Trust)** promotes a **non-regulatory, market-based forest management** paradigm built on equal partnerships among five key certification stakeholders: Master Logger Certified Companies, Consulting Foresters, Small Landowners (numbering 111,000 in Maine), Researchers, and Certified-Product Retailers.
21. Etc.