How Climate Change Could Affect Management of New England Forests

Prepared for
Maine Climate Summit

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New England Forestry Foundation
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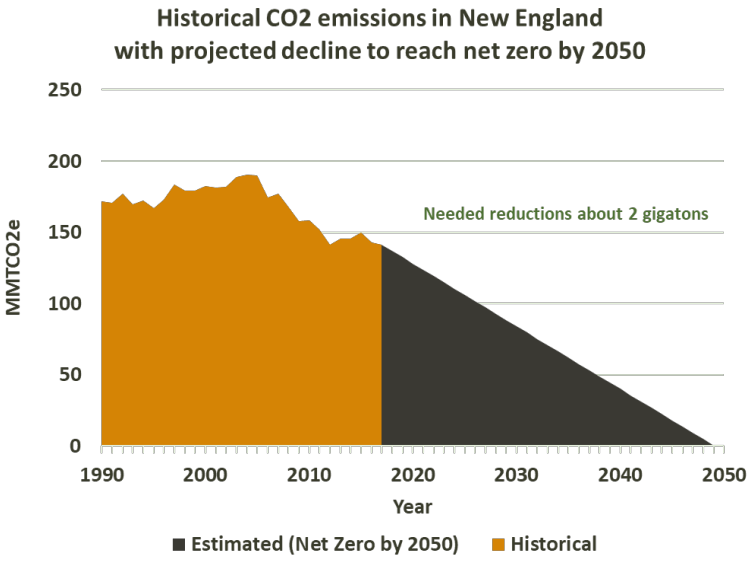
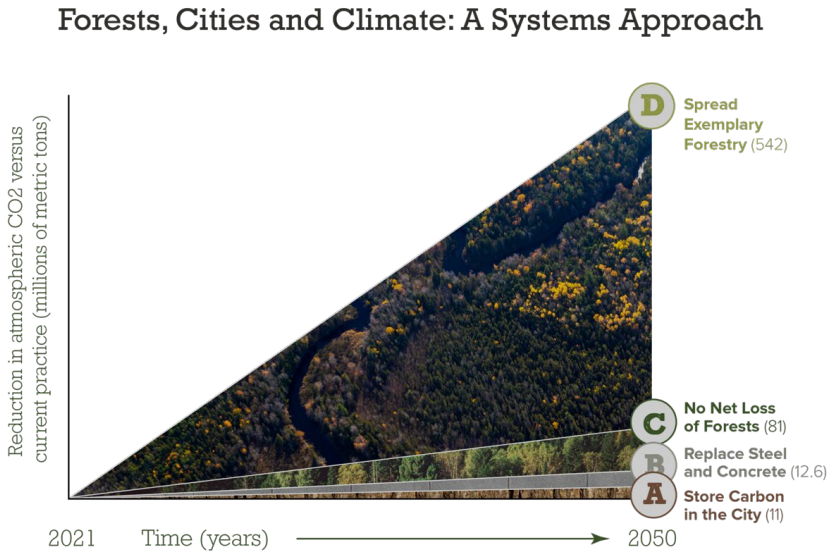
NEW ENGLAND FORESTRY FOUNDATION

Givens

- Changing species composition over time
- Management for:
  - Resistance
  - Resilience
  - Adaptation

Opportunity to manage New England forests to mitigate climate change is very substantial





Three different studies using three different methods, all find that climate benefits are possible

forests

MDPI

Article

Storing More Carbon by Improving Forest Management in the Acadian Forest of New England, USA

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Abstract: The capacity of forests to store carbon, combined with time-tested approaches to managing forests, make forests a useful tool for atmospheric carbon mitigation. The primary goals of this study are to determine the amount of unrealized mitigation available from Improved Forest Management (IFM) in the Acadian Forest of New England in the northeastern U.S., and to demonstrate how this mitigation can feasibly be attained. This study used the Forest Vegetation Simulator (FVS) to model the impacts of IFM practices articulated by the New England Forestry Foundation on carbon storage in the Acadian Forest. Our results, together with empirical data from well-managed forests, show that if the modeled improved management is employed on privately owned timberland across the Acadian Forest of New England, carbon storage could be increased by 488 Tg CO_2e. Our financial modeling shows that IFM could be funded in this region by combining income from carbon markets with the philanthropic funding of conservation easements, timber revenues, and capital investments from private investors who prioritize social and economic goals alongside financial returns. This study adds to the body of evidence from around the world that the potential for managed forests to contribute to climate change mitigation has not been fully realized.

Keywords: carbon storage; forest management; mitigating climate change; natural climate solutions; improved forest management

check for updates

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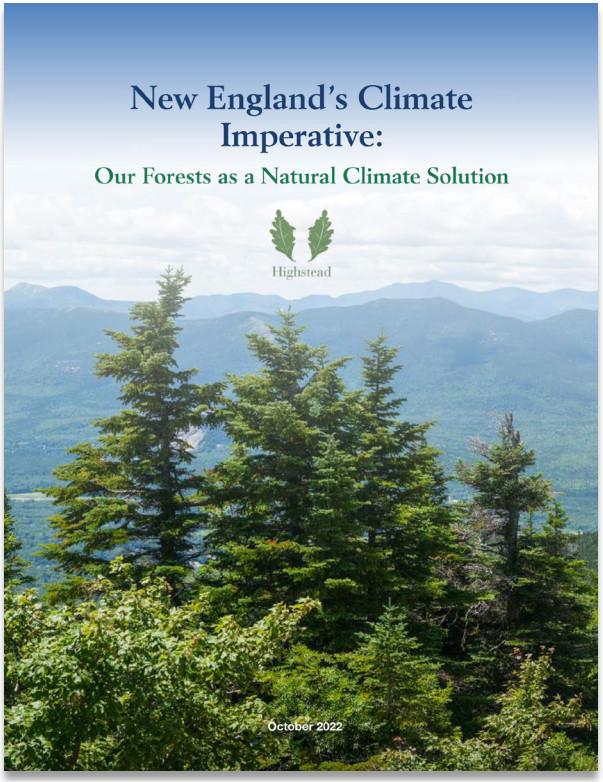
1. Introduction

The world's forests play a key role in mitigating climate change by both storing and sequestering carbon. Global forest ecosystems are estimated to store 861 Pg C, with 363 Pg C in live biomass (above and below ground; [1]). In addition, managed forests produce durable wood products that can store carbon and reduce greenhouse gas (GHG) emissions when they are substituted for alternative products with higher embodied emissions [2].

Forests already serve as a carbon sink globally, but recent work has demonstrated their capacity to do far more to mitigate climate change, and carbon markets are rapidly developing to incentivize a shift in management [3–5]. In contrast with other carbon sinks, such as blue carbon or peatlands, resource managers have more than a century of experience managing forests for a variety of outcomes, which can now include carbon storage [6,7]. Improved Forest Management (IFM) can lead to substantially increased carbon storage simultaneous with increased timber harvests, which allow for additional carbon storage in harvested wood products and reduced GHG emissions from substituting wood for more CO_2-emission-intensive materials [8]. This increase in carbon storage also produces a commodity product in terms of marketable carbon credits where markets exist, an increasingly common situation. While the specific opportunity will vary by forest type and region, studies indicate strong potential for increased climate mitigation in northeastern North America resulting from IFM in this region [9–11]. Additional analyses are needed to help document the scope and scale of such opportunities more broadly [7,12]. In this study,

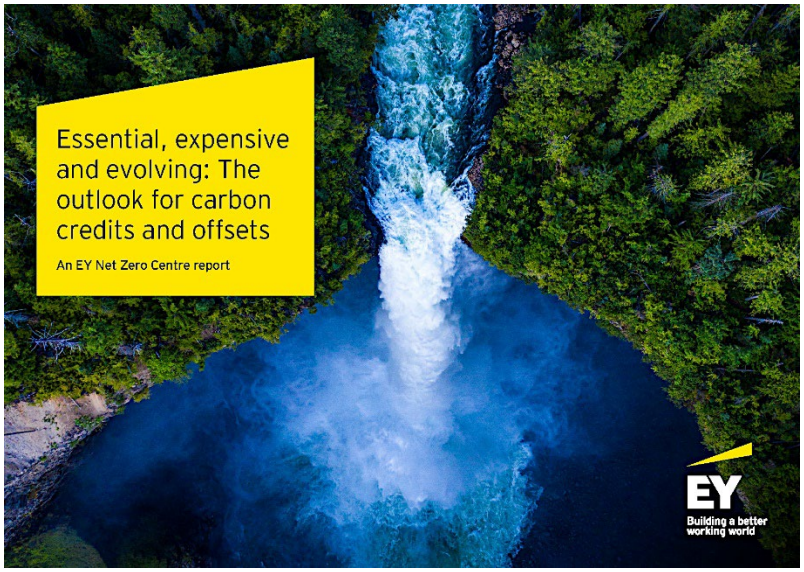


NEFF calculates that with different management, New England's forests could eliminate 30% of the emissions needed to get to net zero

NEFF has received a $30 million grant to pilot climate-smart management

Need a sustained program!

- Nova Scotia program could be a model
- Federal interest in climate change could provide a source of funding -- $27 billion in IRA
- Corporations could provide funding – Ernst & Young predict significant increases in carbon value



Challenges

- Reliable and sustained funding
- Public opposition to cutting trees

NEW ENGLAND
FORESTRY
FOUNDATION

newenglandforestry.org
builditwithwood.org

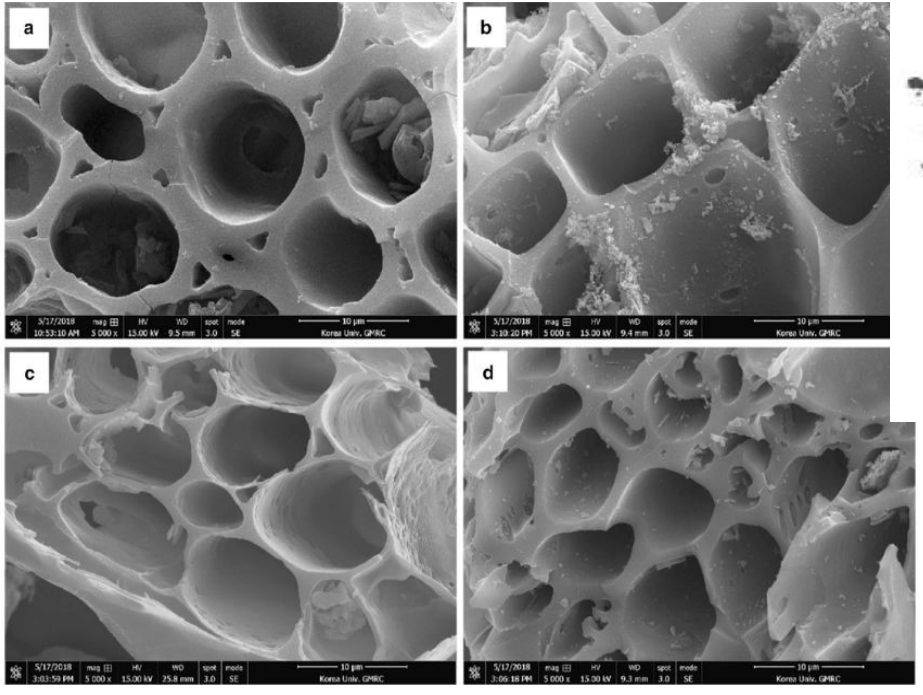
StandardBiocarbon

Biochar: The Ultimate Engineered Forest Product

Frederick Horton

CLIMATEWORK MAINE
It's Everyone's Business!

THIS IS BIOCHAR

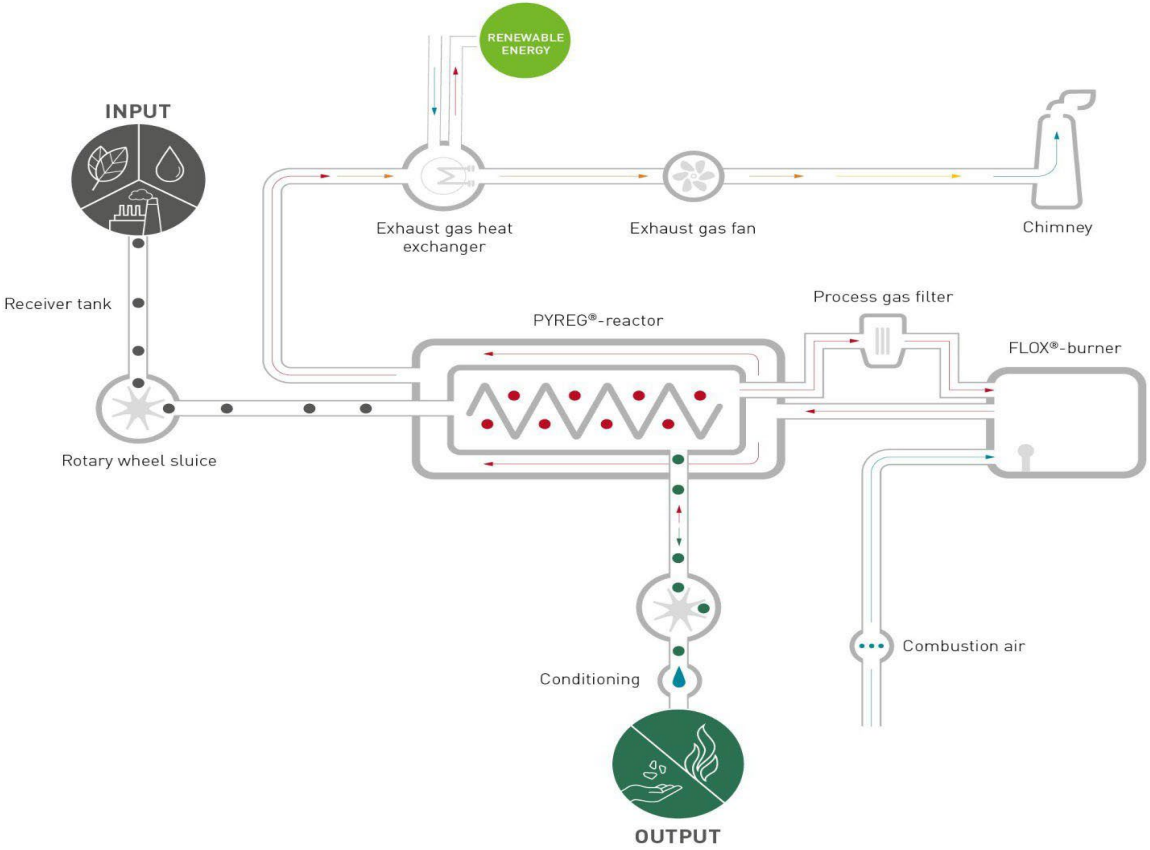


>85% CARBON, NON REACTIVE, NO RESIDUAL VOCs, PROCESSED AT >500C

OUR PROJECT AT THE PLEASANT RIVER LUMBER

STANDARD BIOCARBON ENFIELD SITE

Precision High Temperature Pyrolysis



WHY BIOCHAR

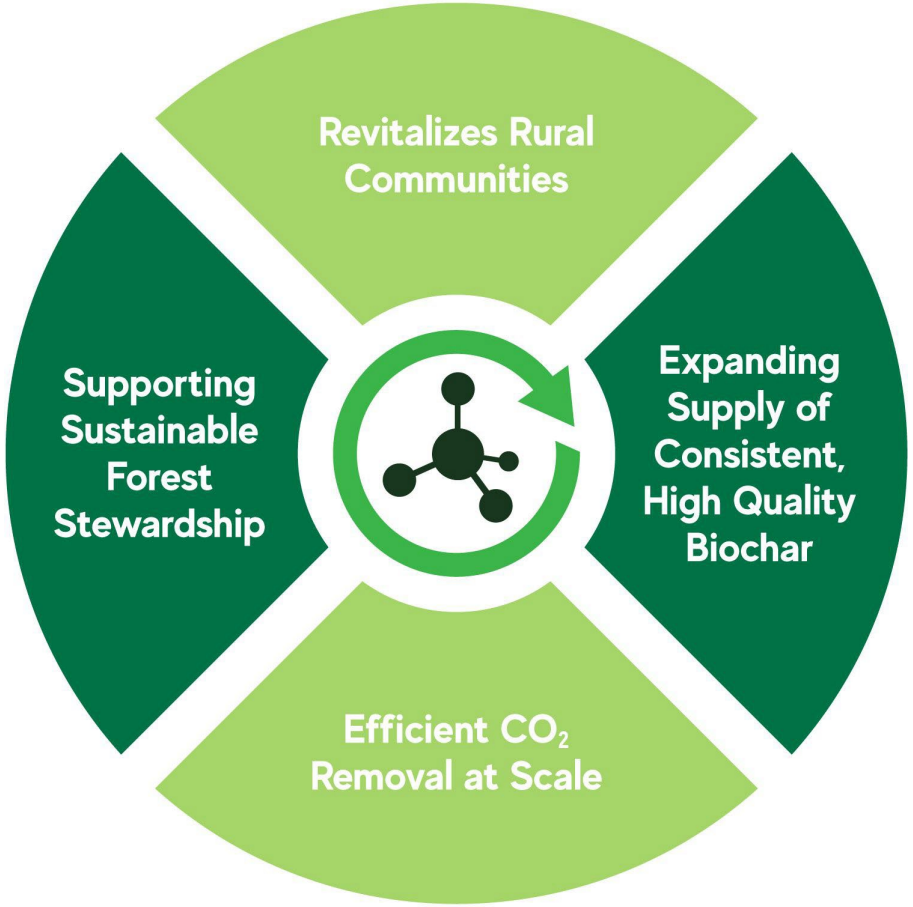
A NEW HIGH VALUE FOREST PRODUCT

Scalable

Clean

Carbon Negative

Standard Biocarbon

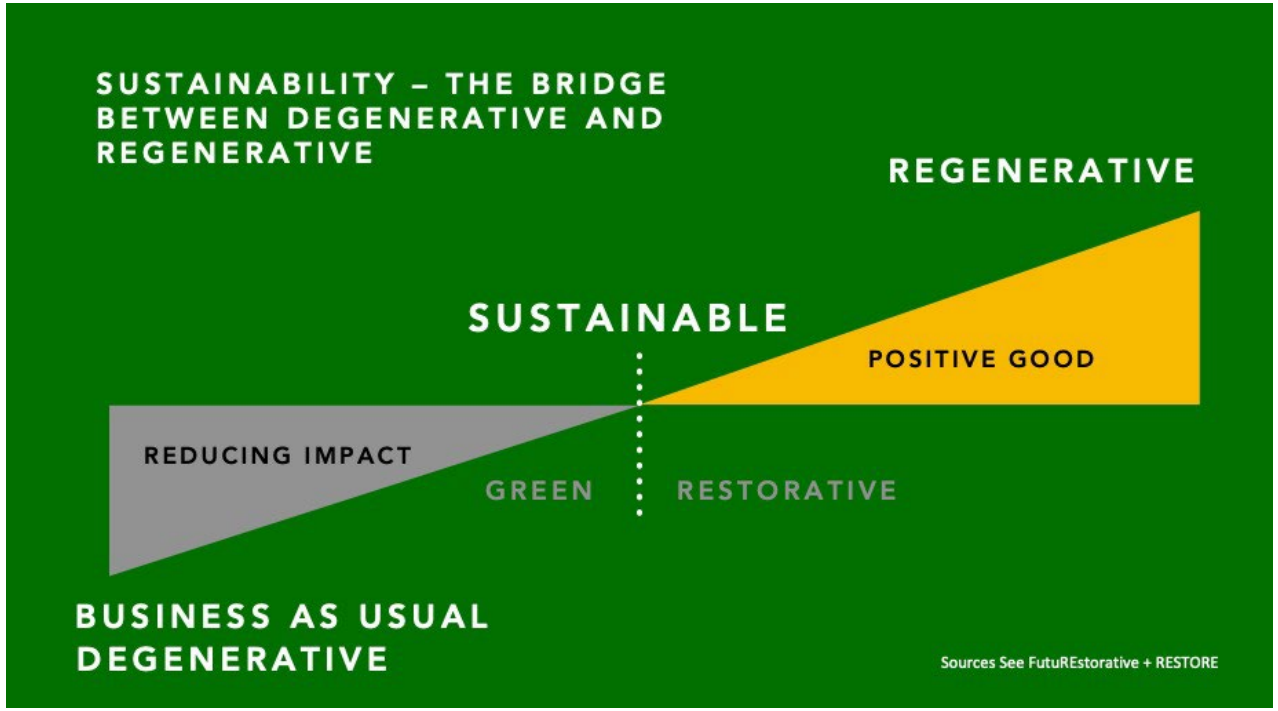


Maine's Forest Economy and Climate Change
5/19/23

Sappi Perspective: Sustainable to regenerative thinking

sappi

Stakeholder expectations are moving beyond *neutral* impact to *regenerative/value creation*



Innovative R&D focus

Unlocking the full potential of each tree

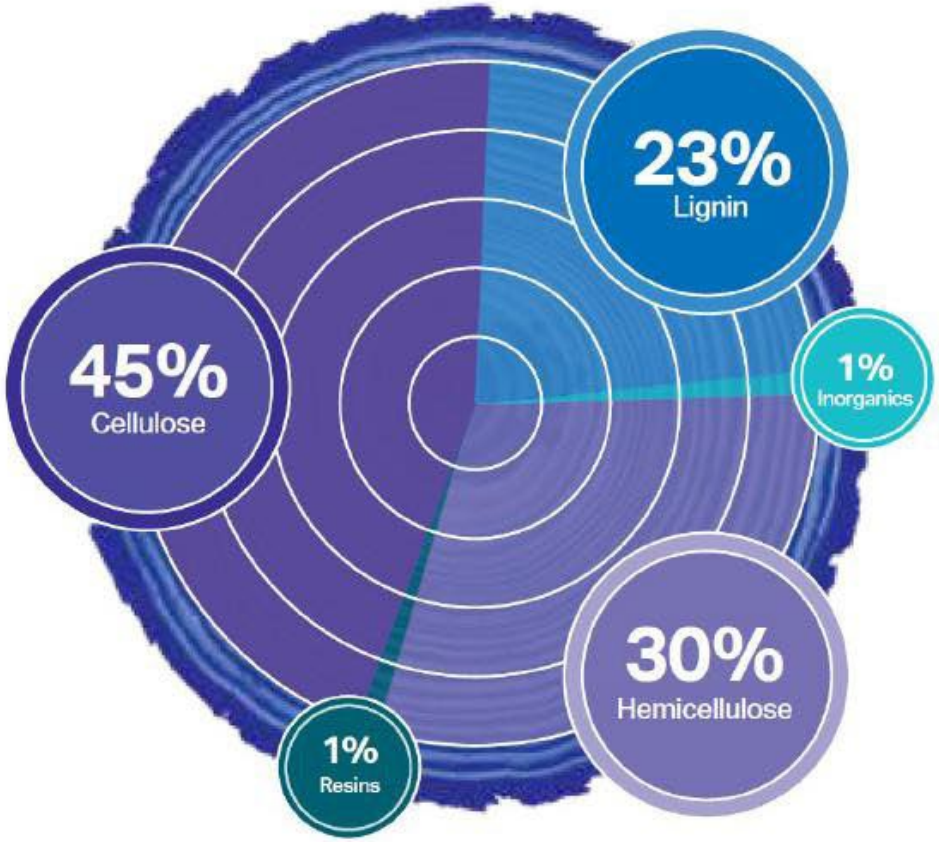
Graphic papers
Packaging and speciality papers
Commercial print and publishing
Product packaging
Technical papers

Pulp
Textiles
Pharmaceuticals
Foodstuffs

Fibre composites
Automotive parts
Furniture
Audio speakers

Nanocellulose
Reinforcing agent
Control release agent
Viscosity modifier

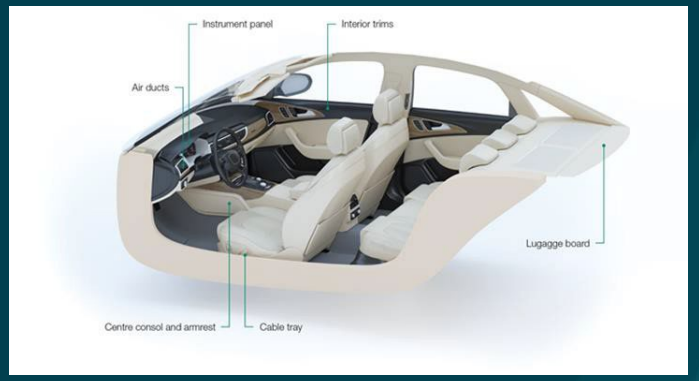
Casting and release papers
Textures for materials
Functional films
Automotive wraps



Chemicals from lignin
Binding agent
Dispersion agent
Emulsion stabiliser

Extraction and beneficiation of C5 sugars
Xylose
Xylitol
Furfural

Nanocellulose, composites, chemicals



Valida forms a **3Dnetwork**

- Agricultural crop damage
- Cosmetics & personal care
- Automotive
- Packaging Barrier Properties

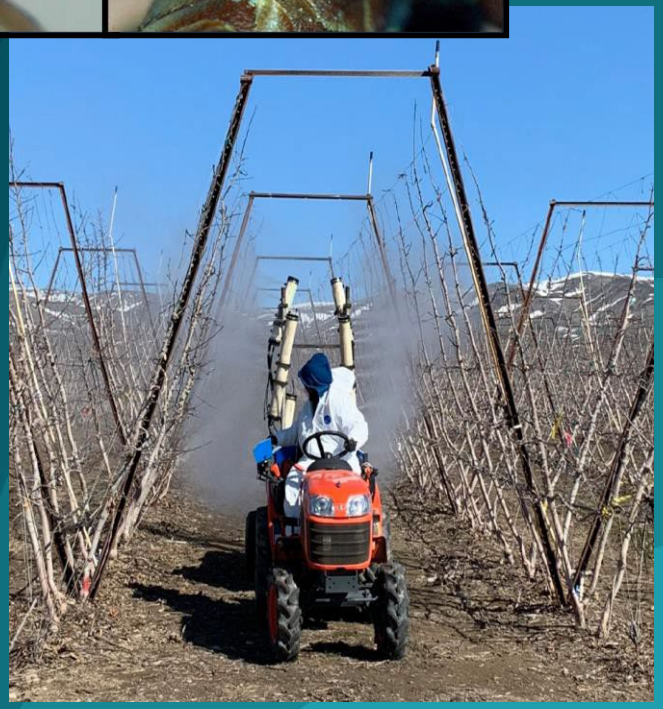
Symbio - treated ground fiber

- Light weighting of composites
- Improved toughness
- Automotive
- Consumer goods

Hemicellulose to chemicals

- Conversion of C5 sugars (Xylose)
- Xylitol (sweetener) or bio chemicals
- Furfural in SSA

Valida as bio-based frost protection



Microfibrillated cellulose – Valida

- Forms a 3D network
- High strength / reinforcing
- Unique coverage and flow properties

CURRENT & EMERGING WOOD PRODUCTS

SAWN TIMBER

Sawn Timber will continue to be a critical component of Maine's forest economy. Demand in the US is largely driven by the number of housing starts, which is expected to continue to strengthen. Lumber is the foundation of forest land ownership and the final product of long-term forest management.

PULP AND PAPER MANUFACTURING

Pulp and Paper Manufacturing continues to be the leader in contributing to Maine's forest economy. Maine's paper mills are shifting production away from graph textile and into tissue, labeling and packaging grades of paper.

ORIENTATED STRAND BOARD (OSB)

Oriented Strand Board (OSB) is an alternative to plywood. It is used extensively as a structural panel in construction. This technology is produced by two major facilities in Maine.

LAMINATED VENEER LUMBER (LVL)

Laminated Veneer Lumber (LVL) is an engineered wood product used in residential construction that uses layers of dried wood veneer. No manufacturing capacity exists in Maine.

MEDIUM DENSITY FIBERBOARD (MDF)

Medium Density Fiberboard (MDF) is a resin-bonded wood-based panel product, manufactured from pulpwood and sawmill residues. Over the past 20 years, laminate flooring and modern furniture has become a major end use for MDF. No manufacturing capacity exists in Maine.

Current Wood Products

CROSS-LAMINATED TIMBER

Cross-laminated Timber is an engineered wood product that is especially well-suited for buildings between 5–18 stories tall. It is very early in the growth curve in North America and rapid growth is expected. Two CLT facilities have announced they will be opening in Maine.

CELLULOSIC SUGARS

Cellulosic sugars are a platform chemical for bioplastics such as Polylactic acid. Lactic acids which can be used as a preservative in food and beverages, and Succinic acid which is used in resins and coatings. Cellulosic sugars are a platform chemical for bioplastics such as Polylactic acid. Lactic acids which can be used as a preservative in food and beverages, and Succinic acid which is used in resins and coatings.

NANOCELLULOSE

Nanocellulose consists of incredibly light and strong fibers that can be used in a variety of applications, from coatings for packaging papers to high performance textiles and medical products. Their University of Maine is a global leader in the R&D of nanocellulose applications.

PYROLYSIS OIL

Pyrolysis oil is a liquid fuel produced from wood, that can be used as heat and power production to substitute the fossil-based oil.

DISSOLVING PULP

Dissolving Pulp can be made into textiles (rayon) and composites with cotton and synthetics (nylon and acrylic). There are no facilities with this capability currently in Maine.

INSULATING WOOD FIBER

Insulating wood fiber composites is an alternative wood based insulating product for homes.

Emerging Wood Products

Diversification into new products that store carbon and replace fossil fuels.

WHOLETREES®
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BDNE

Standard Biocarbon

TIMBERHP
by GO LAB
INSULATE BETTER. LIVE BETTER.™