

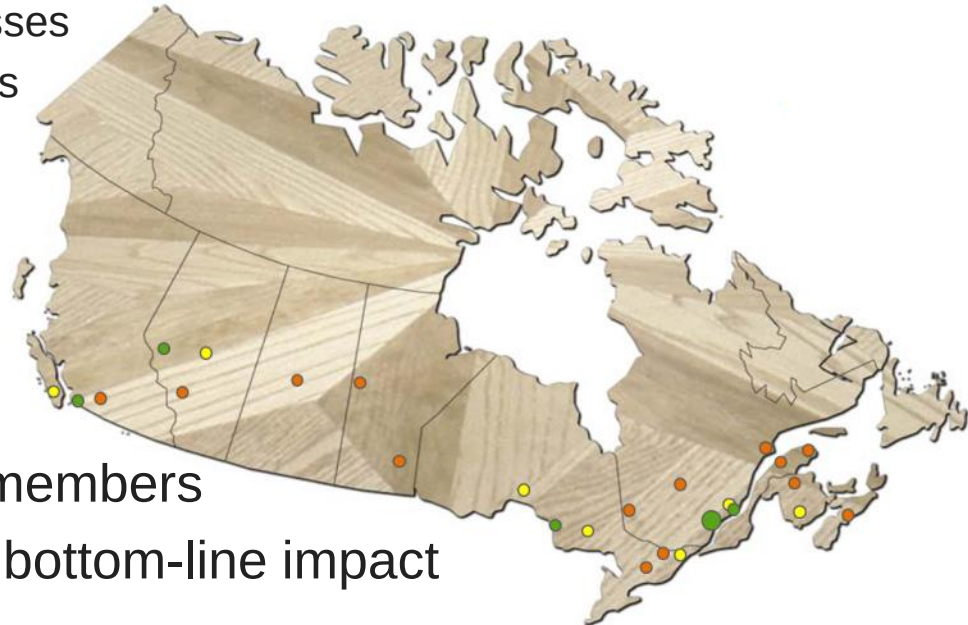


OUR NAME IS INNOVATION

FPInnovations' Research, Development and Commercialization Focus in BC

FPInnovations, a global innovation organisation

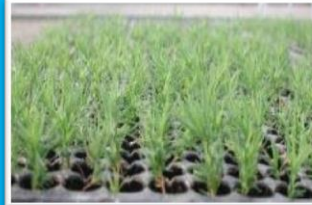
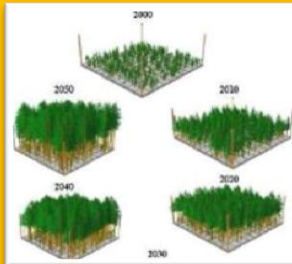
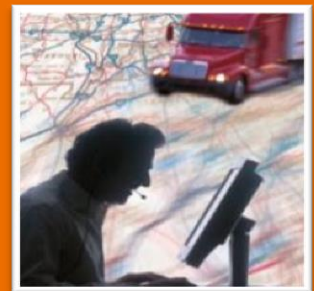
- A private non-profit corporation
- Supports competitiveness of the Canadian forest sector
- More than 500 dedicated employees
- World-class R&D facilities, pilot plants and satellite offices
 - 300+ patents in key forest processing markets around the world
 - 100+ patented technologies and processes
 - Several testing laboratories and facilities
 - Seven pilot plants
- Annual operating budget of approximately \$90 million
- Membership of approximately 210 throughout Canada, including industrial & government members
- A proven track record of delivering bottom-line impact



FPInnovations Upstream Innovation

\$

Use of Technology



Enhanced
Forest Inventory

Genetic Selection, Fibre
Attributes, Pest Control

Operational
Planning

Forest
Harvesting

Resource
Delivery

From Forest to Transformation Site

FPInnovations

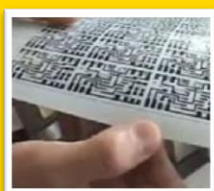
Use of Fibre in Everyday Life

\$

End Products



Wood Products



Pulp and Paper



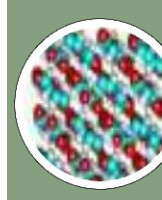
Chemicals



CNC (NCC) & CF



Lignin



Sugars



Energy

Creation of New Materials and Processes

BC Coastal Hem-fir Initiative

■ Objective:

- To enhance the competitiveness of the BC coastal industry by increasing the value of the coastal hemlock and amabilis fir (hem-fir) resource.

FPInnovations in partnership with:

- BC Coastal Forest Industry
- BC Ministry of Forests and Range
- Natural Resources Canada
- Directed by Steering Committee Members:

Value Returned To-Date:

\$50 million implemented industry value

Supporting \$65 million in investment



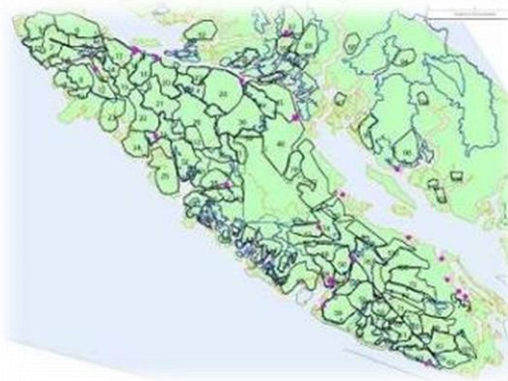
BC Coastal Situation

Issues

- High delivered log costs
- Older manufacturing base
- Resource in transition
- Hemlock is not Douglas fir
- Boat-ride away
- Salt

Opportunities

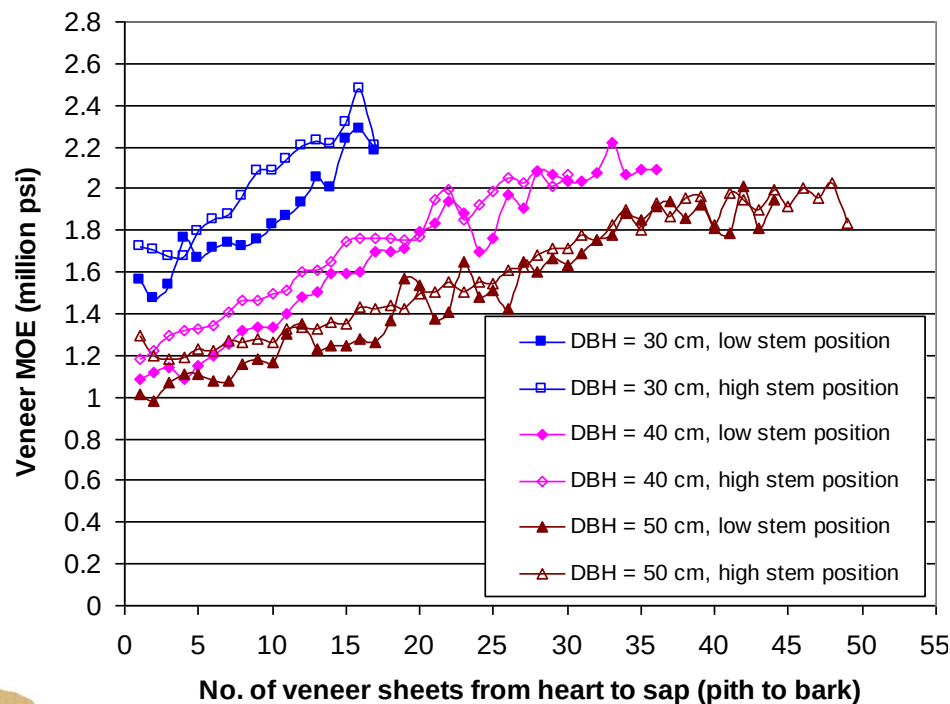
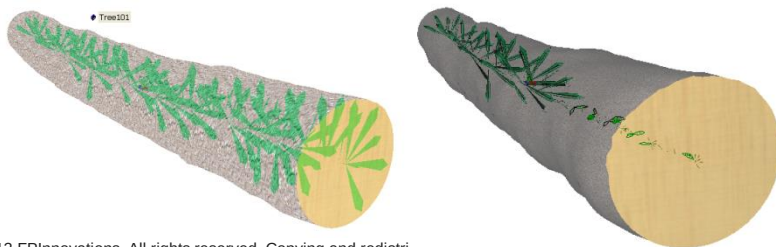
- Stable resource supply
- Large logs
- Diverse species mix
- Deep sea ports
- Operational clusters
- Diverse markets



Quality of the Hem-fir Resource

Large logs, good fibre

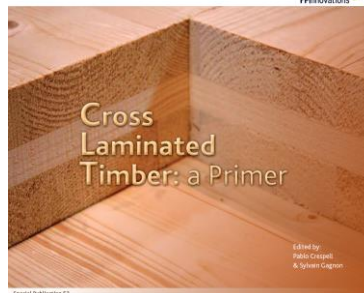
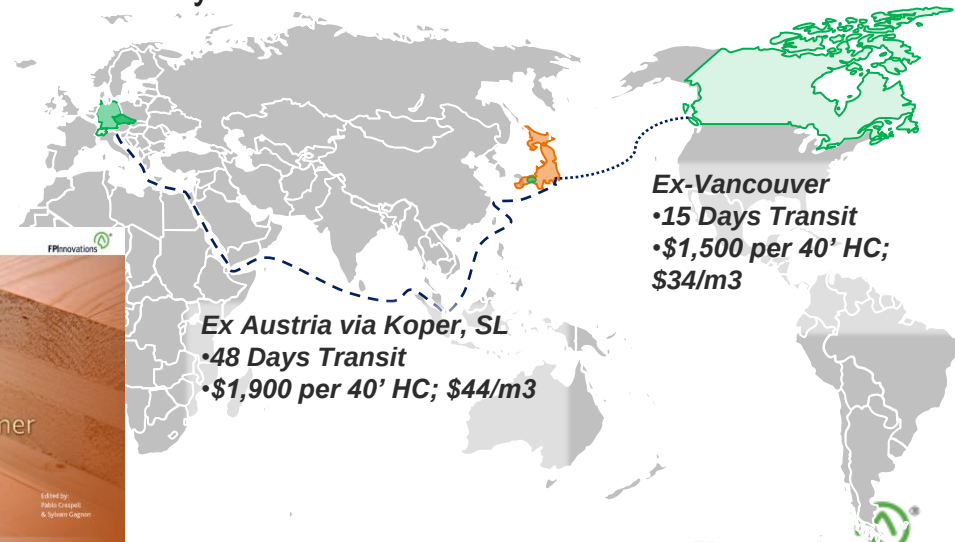
- Reduce rotation age and maintain product quality?
- Strength of 2nd growth hem-fir – higher MOE with slower growth
- Improved prediction of volumes and values from cutblocks
- Attention to internal defects
 - Capturing value from to internal information
 - Identifying scanning requirements to make this possible



Make Higher Margin Products

Capitalize on Competitive Attributes of Hem-fir

- Pacific Silver Fir decking
\$200-400/mfbm margin improvement
- Sound abatement
\$100-200/mfbm margin improvement
- Biomass utilization
Campbell River area has 120k odt/y unutilized delivered at \$55/odt
- Hemlock kraft pulp
Reduced kraft use in paper production by \$2.5 million/y
- CLT from hem-fir
Cost competitive with SPF
Growing Market
Margin potential +\$500/m³



Getting the Right Trees to Products

At the Right Time & Cost

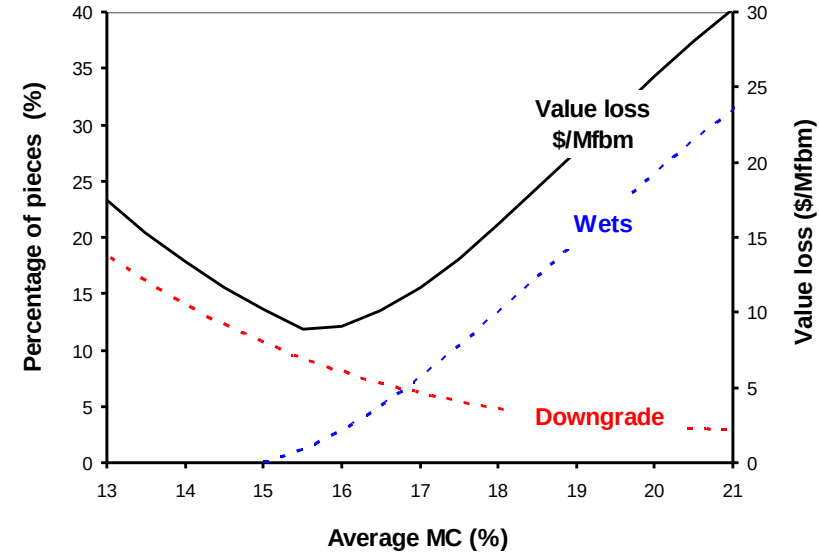
- Scanner scaling
 - Possible \$9 million/year saving
- Water Transport → Benefit or Cost
 - \$12/m³ to -\$6m³ depending on assumptions
- Increased handling for overall margin improvement
- Supply chain planning
 - Integrated annual, monthly and weekly models



Increased Operating Margins

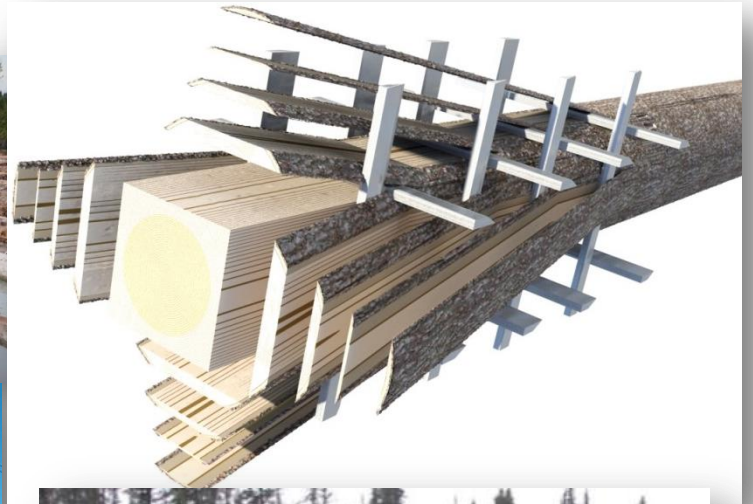
Optimize Processing

- Improved Equipment Utilization
 - ▣ Moisture Separation (+\$8/mfbm)
- Sawmill improvements
 - ▣ Saw speeds, kerf reduction
 - ▣ Scanning for value (\$11/mfbm)
- Simulation tools for improved return to log
- Variations in chip characteristics
(\$1 million/mill/year)



	Hemlock	
	Pt. McNeill	Pt. Alberni
Basic Wood Density (kg/m ³)	471	517
Wood coarseness (μg/m)	399	441
SRE (KWh/t) to 100ml CSF	2050	2506

Hemlock – 65% of the Coastal Resource



Hemlock Attributes – the Good

- White wood – takes stain
- Dense/strong
- Large dimensions possible
- Under-utilized
- Workable
- Established markets (Europe, Japan, US)
- Preferred by Chinese markets
- Species recognition may not matter

Hemlock Attributes – the Bad

- Small overall volume – niche commodity
- Sold as hem-fir - \$2-400 reduction for mixed species in clears market
- High initial MC – longer drying – wet pockets
- Quality degrade – higher than D. fir
- Poorer dimensional stability
- Lower on “treatability scale”

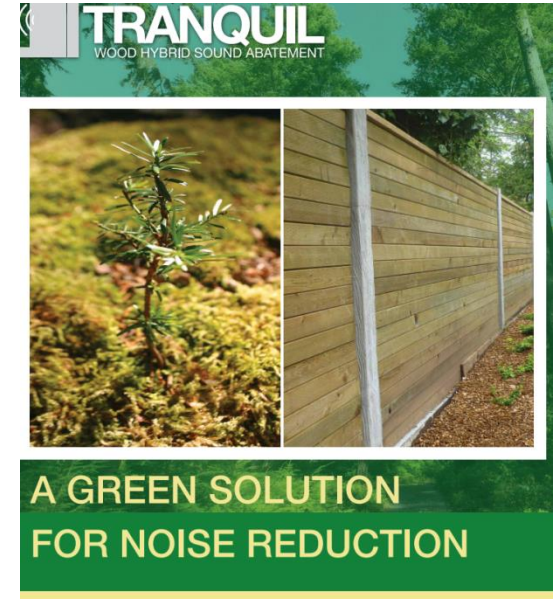
Hemlock Attributes – Good or Bad?

- Relatively low natural durability
- Fast growing
- BC has more than PNW
- Faster chip brightness deterioration
- Desired in TMP processes

Hem-fir Sound Abatement

Successful Product Commercialization

- ~\$10 million in new building with wood since 2011
 - Upgrading \$0.40/bf into a \$2.75/bf system
 - Installed double the rate of concrete
 - Installed cost is 50% less
- Accepted to BC Ministry of Transport Recognized Products List



Manufactured and
distributed by:



New Wood – Urban Living

Targeting slice of the \$18 billion tile market

Light Weight, Urban Markets

- Sq.ft. instead of volume
- Wood Wall Tiles, Deck tiles
- Easy Installation
- Plastic, hidden fastener developed



New Wood – Biodegradable



- Road/Path Stabilization Mats



- Culverts for Resource Roads

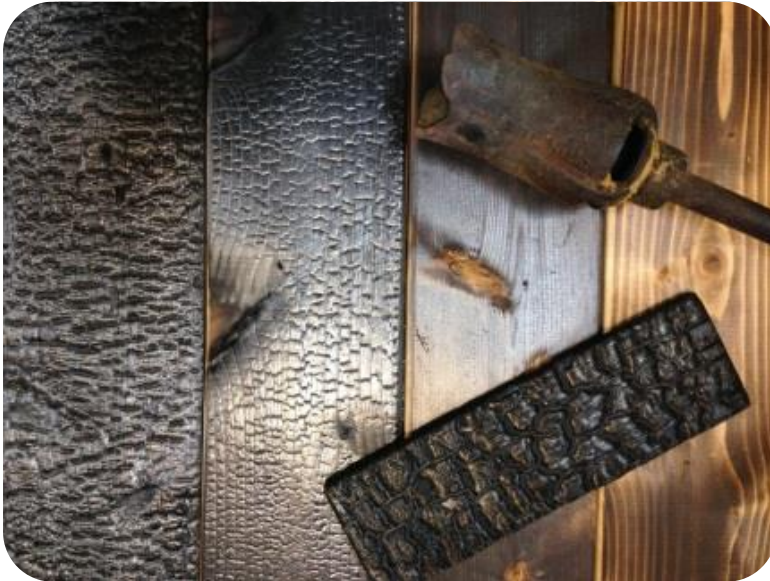


New Wood



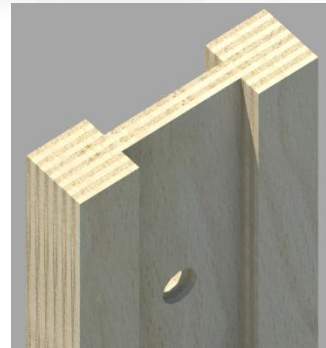
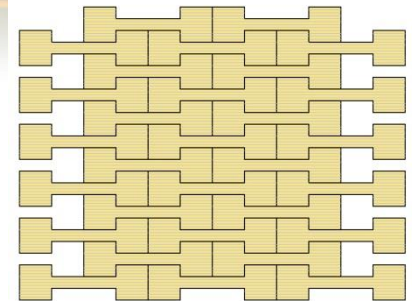
▣ Unique Wood Finish

- Charred Siding - Collaborative project with BCIT



▣ Laminated Object Manufacturing

- Precision cutting and laminating with veneers



Next Generation Opportunities

For Growth & Stability of the Coastal Sector

Full Coastal Fibre Utilization

- Harvesting and Utilizing the Profile
- Maximum Value from Residuals

New Products

- Enhancing Existing Product Lines
- New Products from Sound, Small Logs & Residuals

Novel Technologies

- Novel Breakdown and Automation
- Addressing Key Coastal Issues

Summary of 5 Year Targets

**Full Fibre
Utilization**

**3 million
Additional m³
Delivered**

**\$5/ m³ Reduced
Cost on Steep
Slope**

**5 New Products
from Residuals**

**New
Products**

**Modern
Wood Bridges
(500 Mbf/yr)**

**2 New Durable
Cedar Products**

**100% Enhanced
Cedar is Planted**

**Novel
Technology**

**3 Patented
Processes
Adopted**

**1 Novel Drying
Technique
Commercialized**

**Manufacturing for
1 New Commodity
Product**

Ex. Novel Product Development

Modern Timber Bridge Design

Needs

- Low maintenance
 - Salt/sand resistance (Steel bridges most commonly need replacing)
- North America bridge replacement at critical levels
 - 50% of Canadian bridges are past their lifespan
 - 1200kms of deficient rural US bridges

Benefits to BC

- High value market for heavy timbers
- Develop exportable BC expertise in bridge design/use





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