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Panel: Manufacturing Facilities and Products

Transitioning the forest sector from high volume to high value

May 2, 2023

Quesnel & Area Future of Forestry Think Tank

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Broad forestry context

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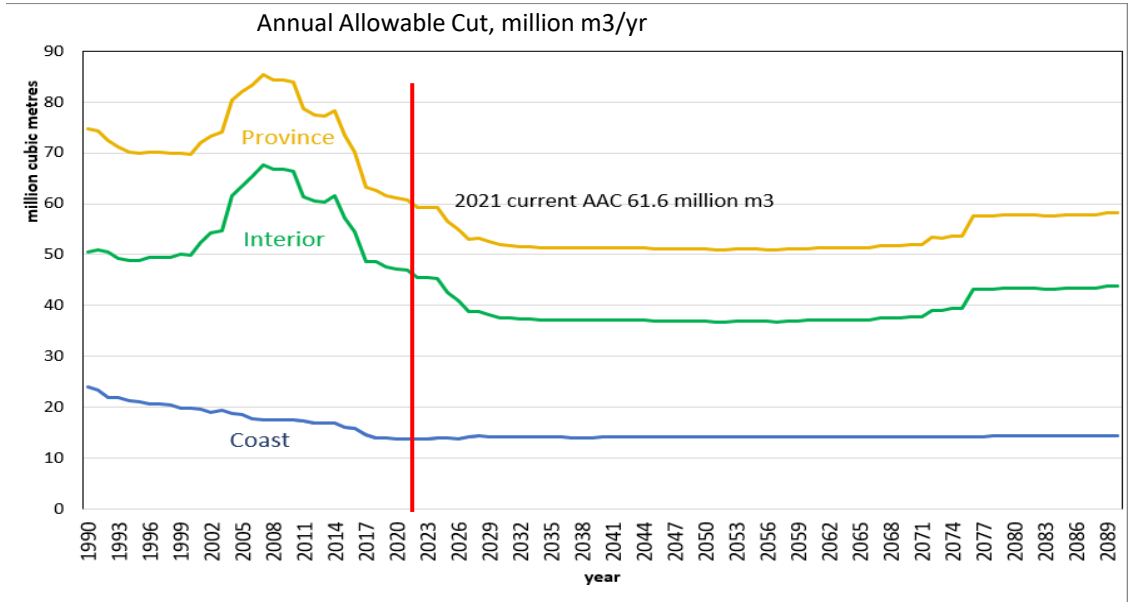
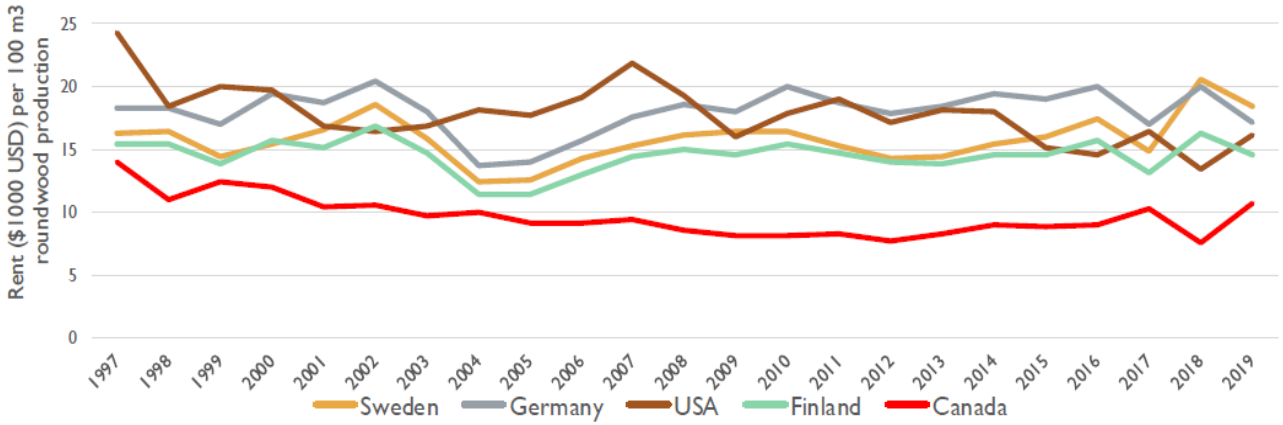
Less fibre available



Low value per unit of wood



Result: A declining forestry sector in need of developing new products that use less fibre and are worth more

Forest sector GDP

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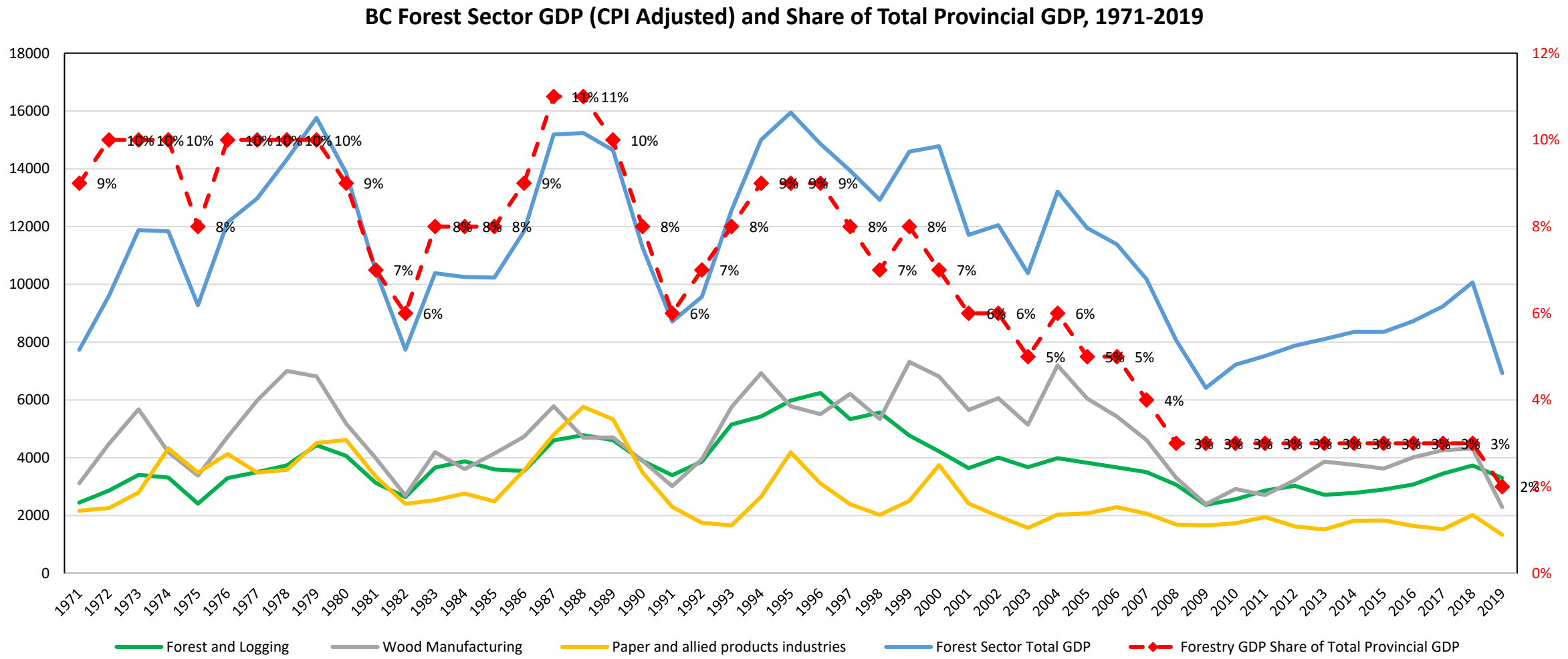

Commodity exports

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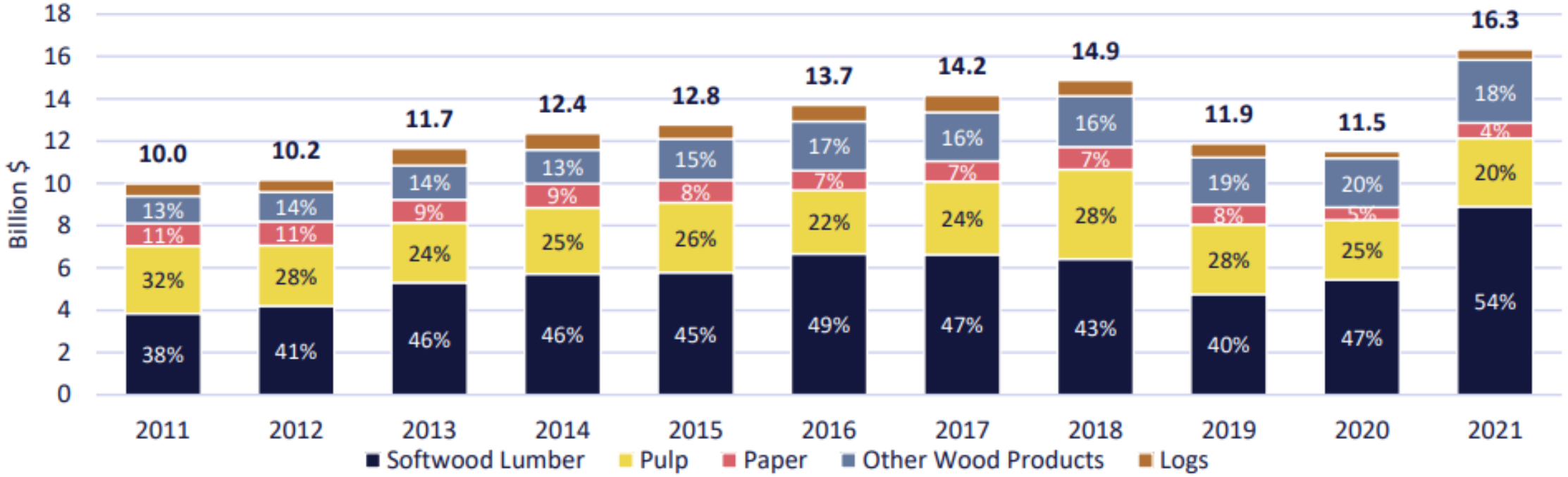
Figure 14: B.C. Forest Product Export Value by Product Type



Source: B.C. Stats extract from Statistics Canada data. Also available from Statistics Canada CIMTD. Historic data is subject to revision.

Bioproduct value pyramid

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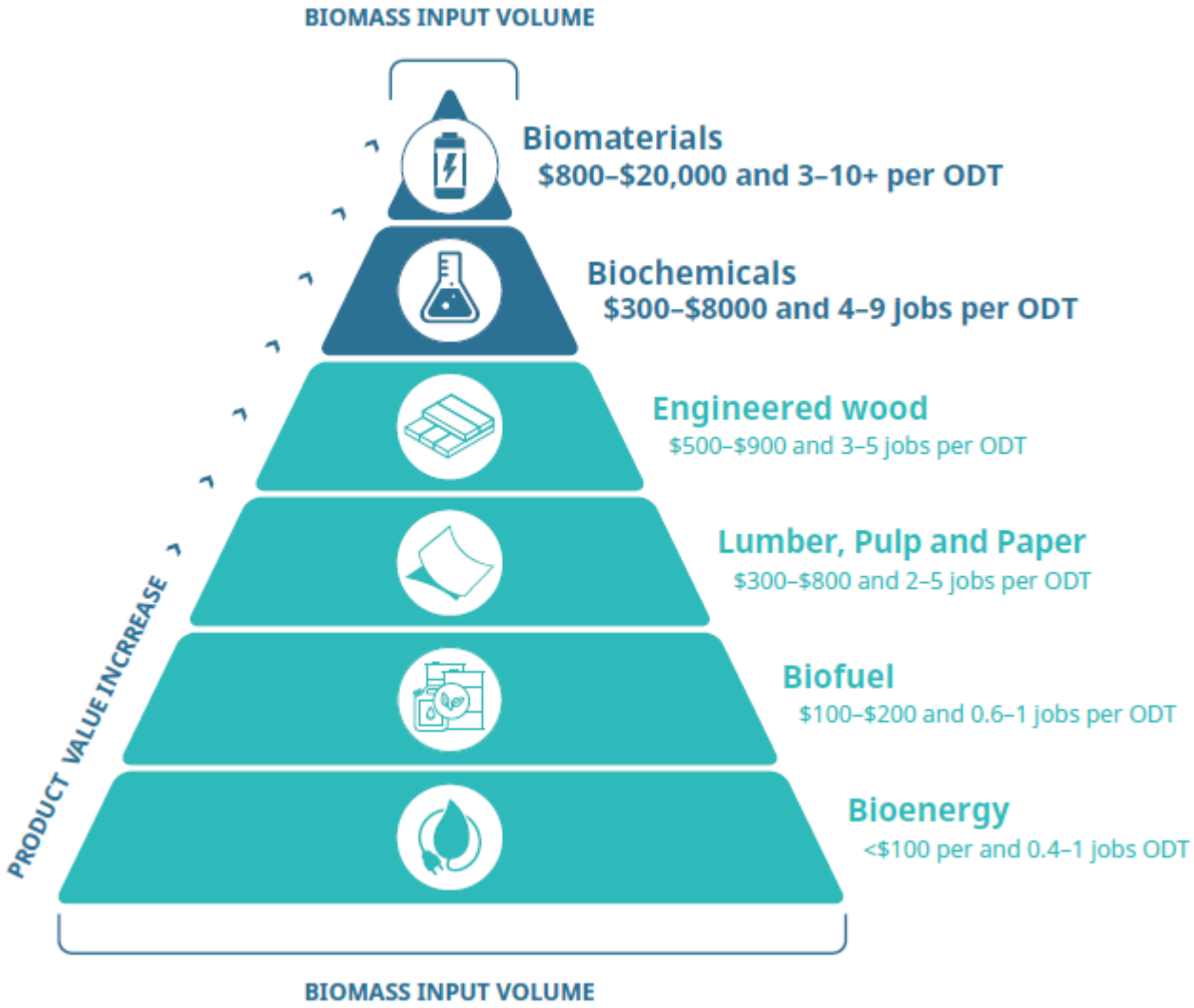
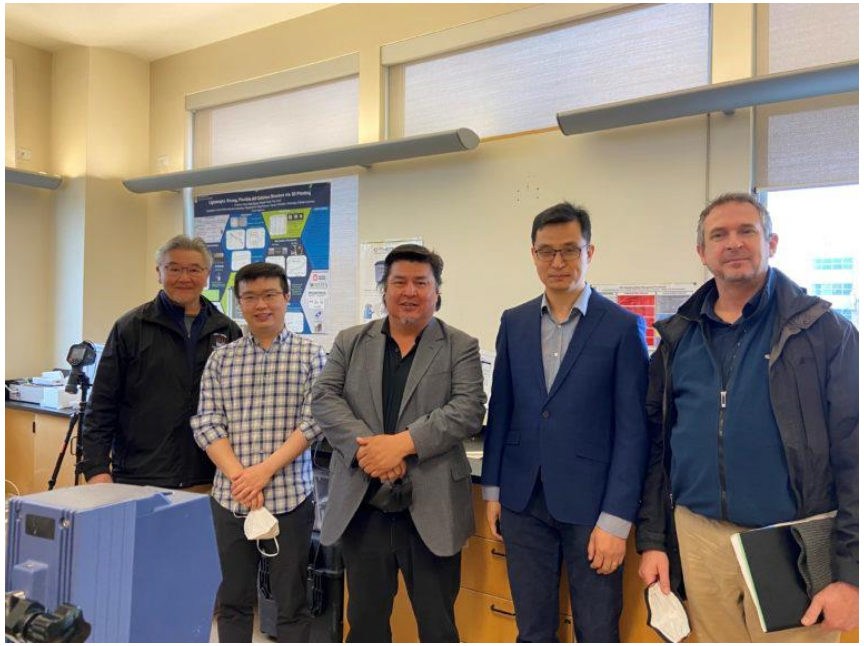


UBC/Yinka Dene LP Biofoam



Partnership between Wet’suwet’en First Nation band and UBC

- Replacing Styrofoam
- Utilizing wood waste
- Degrades naturally within weeks
- New jobs and new product

Deadwood Innovations

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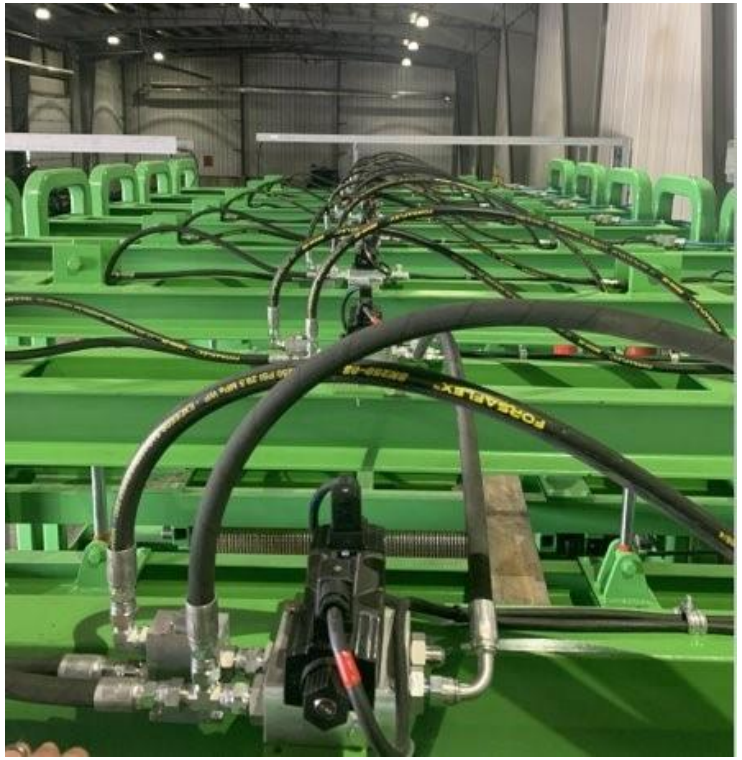

Technology:

- Wood Reformation
- Log Upgrader
- Lumber Upgrader

Joint Venture with the Nak’azdli Whut’en First Nation.

Stuwix BioHub

- 35% more fibre harvested in a test block
- Generate a profit of $70/m3
- Provide 8 full time jobs in Stuwix Indigenous communities
- Significant emissions savings

Lignin-Containing “Bioasphalt”

Quesnel Bio-Asphalt Trials

- Lignin-containing asphalt trials in Quesnel with FPInnovations
- Lignin replaces bitumen, reducing carbon intensity and storing carbon into the future

Lignin Adhesive for Plywood or Other Engineered Wood Products

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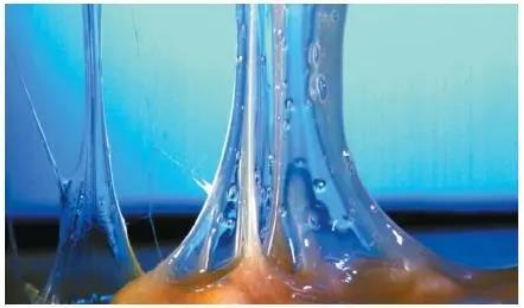
- Opportunity to substitute part of the fossil fuel adhesive components with lignin
- Safer alternative to phenol or formaldehyde
- Based on current adhesive costs lignin based adhesives may provide a cost advantage



Pulp Reinforced Thermoplastics

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- Combines wood pulp and plastics to create raw material for manufacturing
- Stores forest carbon for the life time of the product
- At high pulp content levels may be compostable or a circular economy input for another process

Product	Capital Cost (million CAD)	Production (tonnes/year)	Feedstock (oven-dried tonnes/year)	Net Revenue (million CAD/year)	Government Revenue (million CAD/year)	Per-unit Selling Price of Products (CAD/tonne)	Direct Jobs (fulltime)	Payback Period (years)	2025 Projected Market Size (B USD)	GHG Reduction (tonnes CO2e/ year)
Lignin	33	33,300	-	23.5	0.7	700	25	1.4	1.0	99,200
Microfibrillated Cellulose (MFC)	14	300	700	8.6	0.2	30,000	5	1.6	1.2	600
Cellulose nanocrystals (CNC)	35	300	1,300	18.2	0.4	65,000	10	2.0	1.2	-
Cellulose Filaments (CF)	37	5,200	11,000	25.7	0.6	6,000	20	1.4	2.4	8,900
Pulp Reinforced Thermoplastic Composites	30	12,700	23,000	23.7	0.8	3,000	15	1.3	12.3	54,500
Biochar	35	19,200	76,000	11.9	0.4	1,000	12	2.9		40,000
Integrated Production	116	18,500	36,000	76.1	2.0	-	50	1.5	-	-
RNG Demo	200	750,000 GJ/year	54,750	9.5	0.4	30 CAD/GJ	30	20.9	2.6	38,000

Thank you!

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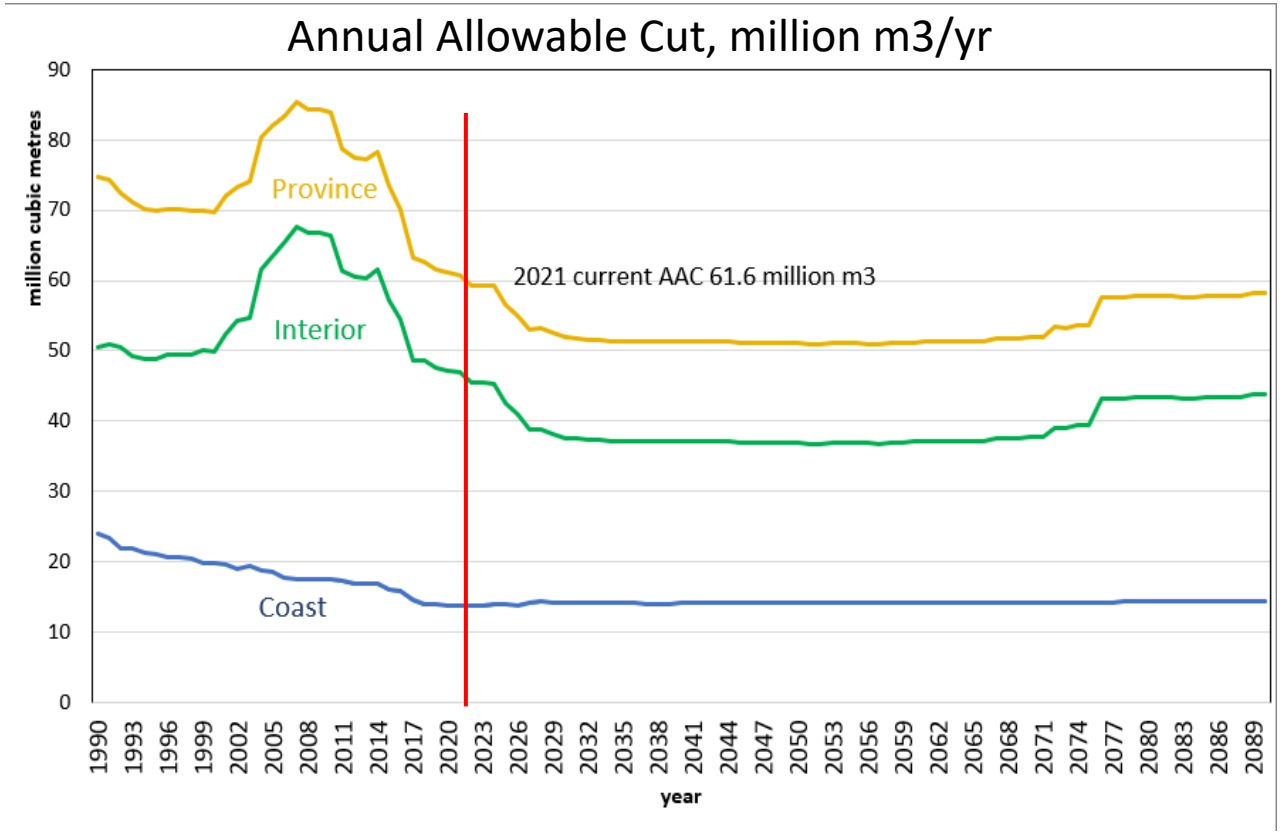
Context: declining AAC

Forestry has been an important part of BC's economy, but:

- Annual Allowable Cut (AAC; i.e. harvest levels) in decline due to:
  - Mountain pine beetle epidemic
  - Wildfires and other large-scale climatic events
  - Old Growth deferrals



Context: value generation

Canada lags in generating value per m^3 of wood harvested

- Value-added benefits are largely realized outside of BC