Perspectives on the Forest Products Industry

Québec Forest Industry Council
Québec City – May 24, 2012
Contents

- Trends and developments in the North American and global markets
- Competitiveness of the Quebec forest sector
- Potential responses and ways forward
### Three fundamental forces drive the most important trends in the forest products industry today

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<th>Fundamental forces</th>
<th>General trends</th>
<th>Key forest-industry trends</th>
</tr>
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<td>Demographic changes</td>
<td>Growing healthcare sector</td>
<td><strong>1. Changed consumption patterns</strong></td>
</tr>
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<td></td>
<td>New consumers</td>
<td>- Stagnation in developed countries</td>
</tr>
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<td></td>
<td>Growing public sector</td>
<td>- Growth in new economies</td>
</tr>
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<td>Experiencing Earth’s limits</td>
<td>Second agricultural revolution</td>
<td><strong>2. Changed production base</strong></td>
</tr>
<tr>
<td></td>
<td>Increased connection between world economies</td>
<td>- Production follows consumption</td>
</tr>
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<td></td>
<td>Growing infrastructure problems</td>
<td>- China/Asia (paper/board)</td>
</tr>
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<td>Urbanization and megacities</td>
<td>- Other emerging markets</td>
</tr>
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<td></td>
<td>Changed economic centers</td>
<td>- (India)</td>
</tr>
<tr>
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<td>Accelerating green economy</td>
<td>- South America (pulp)</td>
</tr>
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<td>Changed social values</td>
<td><strong>3. Changed raw material dynamics</strong></td>
</tr>
<tr>
<td></td>
<td>Increased regulation</td>
<td>- Fundamental land use issues</td>
</tr>
<tr>
<td>Technology and knowledge development</td>
<td></td>
<td>- Biomass for energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Recycled fiber scarcity</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>4. Increasing requirements on sustainability and interest in green products</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>5. New opportunities for construction wood</strong></td>
</tr>
</tbody>
</table>

- Asia & domestic industrialized building
Demand for paper products no longer follows the GDP development in developed markets

**North America**
Base = 100 in 1976 (newsprint); 1991 (copy papers)

**Western Europe**
Base = 100 in 1991

**Source:** RISI; McKinsey Global Institute
Large American newspapers have begun the shift to digital circulation
Average Daily Circulation; Daily copies; Millions

SOURCE: Audit Bureau of Circulations, PaidContent
Copy paper consumption is expected to decrease – Western Europe example

Apparent consumption of copy paper in Western Europe; Million tonnes

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1.6</td>
</tr>
<tr>
<td>2000</td>
<td>3.1</td>
</tr>
<tr>
<td>2010</td>
<td>3.3</td>
</tr>
<tr>
<td>2015</td>
<td>3.0</td>
</tr>
</tbody>
</table>

-1.6% decrease

1 Estimate based on UWF cut-size consumption, actual values slightly higher (estimate 1–3% missing)

SOURCE: EMGE; expert interviews
Tablet penetration is expected to grow rapidly, further impacting graphical papers

Tablets population penetration¹; Percent

Forecast 2012–15

North America
Western Europe
Eastern Europe

1 Installed based/total population

SOURCE: Yankee; Press search; McKinsey analysis
In packaging changing consumer demographics and shopping behaviors create positive dynamics

1. Changing demographics
   - New demands on packaged foods and goods
2. Changing shopping behaviors
   - New requirements on packaging
3. Technology development
   - Higher “churn”; increasing volumes
   - Opportunities for differentiation and higher margins
4. Substrate choice and dynamics

SOURCE: National Bureaus of Statistics; US Census; Hindustan Unilever investor presentations Sep2008; Freedonia; Euromonitor; McKinsey
Relative production capacity is experiencing significant shifts out of Europe/North America

Production capacity; Millions tonnes

What’s next?
- China’s next development step?
- Will southern hemisphere fiber continue to be low-cost?

1 Woodfree capacity for 1995 to 1999 based on actual production and 2000 utilization rate

SOURCE: RISI; McKinsey
In the European Commission’s scenarios, biomass plays a crucial role to secure the EU’s RES targets – threat or opportunity?

EU-27 Final energy consumption\(^1\); TWh

<table>
<thead>
<tr>
<th>2007</th>
<th>Energy growth from biomass(^2)</th>
<th>Growth in other renewables</th>
<th>2020 scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Heat</td>
<td>90</td>
<td>800</td>
<td>1,650</td>
</tr>
<tr>
<td>Direct use</td>
<td>30</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Average of ‘EC proposal with RES trading’ and ‘EC proposal with CDM and RES trading’ scenarios
\(^2\) Varies between 839 and 886 TWh depending on scenario

Increasing biomass trade (due to RES targets) will create new wood-fiber dynamics

Planned new large scale (>350 kt/y) wood pellets mills, as of January 2012

<table>
<thead>
<tr>
<th>Company</th>
<th>Capacity 000 t/y</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>RWE Innogy German Pellets</td>
<td>750</td>
<td>2011</td>
</tr>
<tr>
<td>Canadian Bio Pellet</td>
<td>500</td>
<td>2012</td>
</tr>
<tr>
<td>Enviva</td>
<td>450</td>
<td>2011</td>
</tr>
<tr>
<td>Enviva</td>
<td>400</td>
<td>2011/12</td>
</tr>
<tr>
<td>Point Energy</td>
<td>400</td>
<td>2012</td>
</tr>
<tr>
<td>Enviva</td>
<td>350</td>
<td>2012</td>
</tr>
<tr>
<td>Total NA</td>
<td>~3,300</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Capacity 000 t/y</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vyborgskaya Cellulose</td>
<td>900</td>
<td>2011/12</td>
</tr>
<tr>
<td>German Pellets</td>
<td>400</td>
<td>TBD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Capacity 000 t/y</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suzano</td>
<td>3,000</td>
<td>2014</td>
</tr>
<tr>
<td>Suzano</td>
<td>2,000</td>
<td>2019</td>
</tr>
</tbody>
</table>

SOURCE: Hawkins Wright; WRQ; RISI; Canadian Biomass Magazine; Press search
Global recovered paper supply is tightening, as paper consumption declines and recovery rates reach practical limits in key export regions.

- Continued increase in demand for RCF in Asia, while reduced ‘production’ of RCF in North America/Europe
- Expect increased prices for RCF
- Reduced quality of RCF
  - Increasing RCF share in total furnish
  - Next level of sources used
- Opportunity for fresh fiber, particularly long fiber
- Innovation needed on further reducing fiber share
- Potential competition for RCF from bio-energy

Innovation needed on further reducing fiber share
Sustainability is a ticket to play but its impact is yet unclear

- Sustainability increasingly important – must be integral part of product strategy
- Impact on volumes unclear
- Don’t expect premium for green products – but they can be differentiator to secure business
- Important to shape individual situations
- ‘Sustainability’ often just a way to uncover new opportunities for cost reduction in the value chain
- Innovation needed to ride the wave
There is uncertainty around the timing of the anticipated recovery of annual housing starts.

**Annual housing starts**

Millions of units

- **Actual**
- **Bureau of Census; Moody’s Analytics**
- **McGraw Hill forecast**
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North American paper and paperboard producers’ margins and returns have seen a declining trend over the past 10–15 years

1 Average across ~30 North American paper/board producers

SOURCE: McKinsey CPAT database
North American and European paper producers are generally not well positioned for future growth

Organic growth outlook trajectory 2011–21
Percent CAGR

1 Outlook weighted based on each company’s regional production base and product range, measured in volume (Europe seen as one region)
2 Based on current earnings estimates

SOURCE: Company reports; RISI; Hawkins Wright; EMGE; Bloomberg; McKinsey analysis
How Quebec does on major competitive thrusts?

**Product momentum**

**Asset competitiveness**

- Wood costs
- Other costs
  - Energy price
  - Energy usage
- Labour productivity
Quebec’s asset base is skewed towards segments with poor growth

Quebec inherent growth profile
Annual demand growth, 2011–16e; %

<table>
<thead>
<tr>
<th>Segment</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newsprint</td>
<td>-5.5</td>
</tr>
<tr>
<td>Groundwood papers</td>
<td>-2.8</td>
</tr>
<tr>
<td>Freesheet papers</td>
<td>-2.4</td>
</tr>
<tr>
<td>Other</td>
<td>0.7</td>
</tr>
<tr>
<td>Market pulp</td>
<td>2.2</td>
</tr>
<tr>
<td>Tissue</td>
<td>1.6</td>
</tr>
<tr>
<td>Containerboard</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Inherent growth by world region
Weighted average annual demand growth, 2011–16e; %

<table>
<thead>
<tr>
<th>Region</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC</td>
<td>-1.6</td>
</tr>
<tr>
<td>US</td>
<td>-5.5</td>
</tr>
<tr>
<td>Rest of Canada</td>
<td>0.5</td>
</tr>
<tr>
<td>Europe</td>
<td>3.1</td>
</tr>
<tr>
<td>Rest of World</td>
<td>0.6</td>
</tr>
<tr>
<td>Asia</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Share of capacity; %

1 Demand growth in North America for QC, Canada and US, global demand growth for market pulp

SOURCE: Fisher International; RISI; McKinsey analysis
QC and Canada lumber exports collapsed with US housing crisis – other provinces have been more successful developing new markets.
**Canadian wood costs are mid-range in an international comparison; but high in a North American comparison**

Average delivered prices for pulpwood logs, US dollar per dry tonne

### Hardwood pulpwood Q4 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>253</td>
</tr>
<tr>
<td>Germany</td>
<td>161</td>
</tr>
<tr>
<td>Spain</td>
<td>135</td>
</tr>
<tr>
<td>Sweden</td>
<td>134</td>
</tr>
<tr>
<td>Finland</td>
<td>131</td>
</tr>
<tr>
<td>Australia</td>
<td>130</td>
</tr>
<tr>
<td>Brazil</td>
<td>119</td>
</tr>
<tr>
<td>France</td>
<td>110</td>
</tr>
<tr>
<td>Indonesia</td>
<td>98</td>
</tr>
<tr>
<td>Canada East</td>
<td>93</td>
</tr>
<tr>
<td>Chile</td>
<td>82</td>
</tr>
<tr>
<td>US NW</td>
<td>72</td>
</tr>
<tr>
<td>US South</td>
<td>69</td>
</tr>
<tr>
<td>Russia, NW</td>
<td>58</td>
</tr>
<tr>
<td>Brazil, cost¹</td>
<td>55</td>
</tr>
</tbody>
</table>

### Softwood pulpwood Q4 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>185</td>
</tr>
<tr>
<td>Sweden</td>
<td>176</td>
</tr>
<tr>
<td>Finland</td>
<td>166</td>
</tr>
<tr>
<td>Germany</td>
<td>163</td>
</tr>
<tr>
<td>Canada East</td>
<td>162</td>
</tr>
<tr>
<td>France</td>
<td>151</td>
</tr>
<tr>
<td>US NW</td>
<td>109</td>
</tr>
<tr>
<td>Canada West</td>
<td>107</td>
</tr>
<tr>
<td>Spain</td>
<td>107</td>
</tr>
<tr>
<td>Brazil</td>
<td>106</td>
</tr>
<tr>
<td>Australia</td>
<td>100</td>
</tr>
<tr>
<td>NZ</td>
<td>97</td>
</tr>
<tr>
<td>Russia, NW</td>
<td>90</td>
</tr>
<tr>
<td>Chile</td>
<td>84</td>
</tr>
<tr>
<td>US South</td>
<td>71</td>
</tr>
</tbody>
</table>

¹ Integrated cash costs of forestry, harvesting and transport for company with own forests – much lower than prices on the (limited) open market

**SOURCE:** Wood Resources International; McKinsey analysis
Pulpwood prices in Eastern Canada have fallen in CAD – but only to maintain global competitiveness in USD terms

Pulpwood costs in Quebec and Ontario

- CAD/m³

Pulpwood costs in Quebec and Ontario

- USD/m³

SOURCE: RISI World Timber Price Historical Data
But Canadian mills are high-cost in other areas than wood

BSKP cash cost of production, Q1 2012 FOB

SOURCE: Hawkins Wright, March 2012; McKinsey
Quebec producers appear to benefit from low electricity prices

Average electricity prices for industrial consumers, 2011
US¢/kWh

- Canada, QC: 4.9
- Canada, BC: 5.0
- Russia: 5.3
- US South: 6.6
- Sweden: 6.6
- US West: 6.8
- Chile: 7.8
- US Northeast: 8.7
- Finland: 8.8
- Canada, ON: 9.1
- China: 9.2
- Germany: 9.3

SOURCE: Hydro-Quebec; UK DECC; Fisher International; McKinsey
Canadian assets are older and less well invested than most competitors

**Average Technical Age**
- **Years**
- **1960** to **1995**

**Established regions, low re-investment**
- Canada
- Russia
- US
- Sweden
- UK
- Germany
- Finland
- Austria
- Spain

**Established regions, high level of re-investment**
- Australia
- Brazil
- Indonesia
- South Korea
- India
- China

**New growth regions**
- Chile
- China

**SOURCE:** Fisher International; McKinsey analysis
The Quebec sawmill industry remains dominated by small-scale mills

### Average sawmill size, 1995–2009

<table>
<thead>
<tr>
<th>Region</th>
<th>~1995 (000 m³/year)</th>
<th>2009 (000 m³/year)</th>
<th>% change</th>
<th># mills, 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Interior</td>
<td>260</td>
<td>400</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>BC Coast</td>
<td>200</td>
<td>210</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>US West</td>
<td>160</td>
<td>255</td>
<td>60</td>
<td>180</td>
</tr>
<tr>
<td>Canada East</td>
<td>135</td>
<td>170</td>
<td>25</td>
<td>210</td>
</tr>
<tr>
<td>US South</td>
<td>100</td>
<td>150</td>
<td>50</td>
<td>420</td>
</tr>
<tr>
<td>US Northeast</td>
<td>40</td>
<td>50</td>
<td>25</td>
<td>95</td>
</tr>
</tbody>
</table>

- Small sawmill size partly related to resource – small diameters due to severe winters and short growing season, reducing efficient sawmill scale
- Investment has been lacking, due to several challenging markets
  - US export tariffs and quotas
  - Reduced AAC from public lands
  - Reduced P&P sector demand for chips

SOURCE: Natural Resources Canada’s Sawmill Atlas; USDA Forest Service
Canadian mills tend to be less labor and energy efficient

Average BSKP\(^1\) production efficiency, 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Labor (Tonne/employee)</th>
<th>Energy (Tonne/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>0.48</td>
<td>0.48</td>
</tr>
<tr>
<td>Chile</td>
<td>0.46</td>
<td>0.44</td>
</tr>
<tr>
<td>Germany</td>
<td>0.44</td>
<td>0.42</td>
</tr>
<tr>
<td>US</td>
<td>0.40</td>
<td>0.38</td>
</tr>
<tr>
<td>Russia</td>
<td>0.36</td>
<td>0.36</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.34</td>
<td>0.34</td>
</tr>
<tr>
<td>Austria</td>
<td>0.32</td>
<td>0.32</td>
</tr>
<tr>
<td>Canada</td>
<td>0.38</td>
<td>0.38</td>
</tr>
</tbody>
</table>

1 Including fluff pulp

SOURCE: Fisher International; McKinsey analysis
But labor productivity has improved over the last decade

**Development of production per employee, Canadian basic materials sectors**

Annual percentage change, 1999–2010

![Chart showing percentage changes in production per employee for various sectors.

- Sawmills: 4.2%
- P&P: 4.0%
- Aluminum: 3.4%
- Logging: 1.4%
- Coal: -0.2%
- Cement: -1.2%
- Chemicals: -1.6%
- Oil and gas: -2.3%

SOURCE: Statistics Canada; Coal Association Canada; FAO; RISI
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## Four potential elements of an industry-wide transformation

<table>
<thead>
<tr>
<th>1. Structural changes</th>
<th>Inevitable! But consolidation <em>per se</em> not certain to help</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Productivity and functional excellence</td>
<td>Cost will continue to be king!</td>
</tr>
<tr>
<td>3. New S-curve for markets – new and old</td>
<td>Enthusiasm and realism; focus on what you are good at</td>
</tr>
<tr>
<td>4. Business environment</td>
<td>Value creation drives jobs – not the other way around</td>
</tr>
</tbody>
</table>

There is no silver bullet!
The Canadian newsprint industry has made great efforts to balance the market by closing capacity – but we need to expect more is to come.

Canadian newsprint demand and operating rates

Canadian newsprint closures

1 Including closures of indefinitely idled machines

SOURCE: RISI; McKinsey analysis
Relying on consolidation to improve the industry is a risky strategy

**Difficult to do**
- High closure costs
- Still often attractive for new capacity
- Political agenda not always aligned with industry needs
- Different perceptions of entity value
- Increasingly difficult to find synergies
- Interpersonal chemistry

**Not clear that it would work – desired market characteristics**

**Limited supply leaks**
- Limited capacity expansion
- Limited grade switching
- Limited trade flows

**Little demand porosity**
- Little substitution
- Low elasticity
- Limited customer power

**Opportunity for leadership**
- Enough capacity to bridge demand gaps
- Economic benefits
- Aligned incentives

SOURCE: McKinsey analysis
Introducing the ‘Lean Mill’ can yield significant cost reductions

**Newsprint**
EUR/tonne, delivered

**Potential cash cost reduction**
5–10%

**Typical improvement experience**

**Productivity/lean**
- ~5% increased production at same marginal contribution
- Variable cost decrease of 2–5%

**Fixed cost reduction**
- 15–20% reduction (production, maintenance, support functions)

**Procurement**
- 2–5% reduction on fiber and energy categories and 10–20% on others

**SG&A**
- 25% reduction of SG&A cost

Source: RISI; McKinsey analysis
Our experience indicates energy efficiency can be improved by 10–15% across all industry sectors, including P&P.

<table>
<thead>
<tr>
<th>Industry sector</th>
<th>Category</th>
<th>Achieved savings in percent of total energy costs with payback &lt;3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Integrated upstream</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Electric arc furnace</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Downstream processing</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td>Mining</td>
<td>Beneficiation plant</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td>Chemical</td>
<td>Batch processing</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Continuous processing</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>High intensity</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td>Pulp and paper</td>
<td>Paper production</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td>Consumer goods</td>
<td>Dry goods fabrication</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Liquid goods fabrication</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Packaging</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td>Automotive and assembly</td>
<td>Assembly serial production</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Mechanical/plant engineering</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Machining lines</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td>Retail</td>
<td>Warehouses</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
<tr>
<td></td>
<td>Shops</td>
<td><img src="image" alt="Impact achieved Min Max" /></td>
</tr>
</tbody>
</table>

SOURCE: McKinsey
Productivity is fundamental even in forest activities (e.g., harvesting)

- **Technical systems**
  - From... to...
  - Standardized, well trained methodology where each harvester reaches ‘best practice’ productivity

- **Formal structure and organization**
  - From... to...
  - Precise and regular control/follow-up with correcting actions taken ‘here and now’

- **Leadership and mindsets**
  - From... to...
  - Harvesting groups working towards same target, with same methodology and with leaders that are present and act as role models

SOURCE: McKinsey
Marketing and sales are generally not focus areas of excellence in the forest products industry but can have substantial impact.

**Capabilities**

**Marketing**
- Strategic marketing and go-to-market model
- Innovation in products and services
- Product management
- Pricing and contract management
- Customer management
- Channel management
- Field sales force management
- Tactical optimization of sales and supply

**Sales**

**Typical potential**
- 2–3% ROS
- 2–10% growth above market

**Enablers**
- Organization and pivotal roles
- Talent and skills, mindsets and behaviors
- Performance management
- Information and analytical tools
Swedish steel companies survived crisis of the 70's through specialization

Catalyst

- Crisis in Swedish steel industry in the 1970s
  - Disappearance of the Swedish ship building industry
  - Decline of Swedish construction sector
- Strong market competition due to liberal Swedish trade policy – leading to an increase in imports
- Steel companies pressured to increase profitability in order to survive

Structural change

- Many companies chose specialization to avoid tough price competition in bulk products
- Chose to cultivate image of high-quality, expert producers within their respective segments
- Close cooperation with end customers enabled R&D to create new products and adjust metallurgical processes to stay in the lead

Result

- Sweden world leader in several specialty steels
- ~85% of production exported
- Bulk products mostly imported

Number 1–2 globally

- Seamless tubes
- Welded tubes
- El. resistance wire
- Wear resistant steel
- Iron and steel powder
- Stainless wire rod
- Ball bearing steel

SOURCE: Jernkontoret; McKinsey
Bio-refineries to maximize the value of a tree holds a lot of promise – much research still needed before generally attractive

- Fiber/textiles
- Acetates/ethers
- Foam
- Nano materials
- Composites

Chips

- Bark and harvest residues

Gasification
- Methanol
- DME
- Bio diesel

Glucose
- Ethanol
- Butanol

Extractives
- Fatty acids
- Tannin
- Anti-oxidizers

Hemicellulose
- Film/barriers
- Hydrogels
- Base chemicals
- Bio-polymers

Lignin
- Pellets
- Active carbon
- Phenols
- Carbon fiber
- Emulsifiers

• ‘Value-added’ often equals ‘cost-added’ – not necessarily the same as ‘value creating’
• There is no ‘new economy’ – supply-and-demand laws still apply
• Other industries are moving too – wood is not the only biomass feedstock

SOURCE: Adapted from P. Axegård, STFI-Packforsk (Innventia), PIRA Energy Management Conference, October 2006
In paper and forest products, value is often created in the upstream and downstream parts of the value chain. 2005–10 average ROCE and EBITA margin

<table>
<thead>
<tr>
<th>Level of profitability</th>
<th>Position in value chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>Upstream¹: ROCE (%): 6 (3–12) EBITA (%): 25 (6–78)</td>
</tr>
<tr>
<td>Pulp</td>
<td>Midstream²: ROCE (%): 3 (-5–11) EBITA (%): 7 (-3–20)</td>
</tr>
<tr>
<td>Paper and board</td>
<td>Midstream³: ROCE (%): 23 (-4–9) EBITA (%): 5 (1–11)</td>
</tr>
<tr>
<td>Magazine publishers/CPG</td>
<td>Downstream⁴: ROCE (%): 12 (5–30) EBITA (%): 13 (-1–23)</td>
</tr>
</tbody>
</table>

1 Average of 8 companies
2 Average of 25 companies
3 Average of 14 companies
4 Average of 15 companies

SOURCE: CPAT; McKinsey analysis; Odin; Company websites; McKinsey
There appears to be significant potential to increase wood demand in non-residential and high-rise construction.

**Wood share of construction, Quebec**

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>95</td>
</tr>
<tr>
<td>Non-residential</td>
<td>80</td>
</tr>
<tr>
<td>Sweden:</td>
<td>65–70</td>
</tr>
<tr>
<td>US:</td>
<td>10–15</td>
</tr>
</tbody>
</table>

**Potential new demand**

- Million board feet
  - QC: 360
  - Canada: 2,750
  - US: 9,500

SOURCE: CecoBois; Wood Products Council; Swedish Wood; McKinsey analysis
In Sweden, an emerging trend towards more industrialized wood construction is leading to increased penetration in the building market.

<table>
<thead>
<tr>
<th>Type of construction</th>
<th>Wood market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential – 1 storey</td>
<td>&gt;90</td>
</tr>
<tr>
<td>Residential – 2 storey</td>
<td>&gt;50</td>
</tr>
<tr>
<td>Residential – 3-8 storeys</td>
<td>&gt;15</td>
</tr>
<tr>
<td>Sports arenas etc</td>
<td>&gt;30</td>
</tr>
<tr>
<td>Bridges¹</td>
<td>&gt;20</td>
</tr>
</tbody>
</table>

¹ Includes smaller pedestrian bridges

~50% of all new construction

SOURCE: Svenskt Trä (Swedish Wood)
Still many obstacles to increased industrialization of wood construction

Small and fragmented wood-product actors (with small voices)

Complex building codes that make standardization difficult

Few national/international agreements or targets

Lack of knowledge among policy- and decision makers

Increasing competition from other building products

Risk-averse, conservative customers
In summary

A paradigm shift
- Fundamental shifts in consumption patterns, industry structure, and raw materials dynamics

Quebec/Canada in challenging position
- Western world demand stagnating for many traditional paper products (brighter for wood products)
- Quebec in challenged starting position e.g., regarding product portfolio, cost base, and assets; but raw material (virgin fiber) could see revival of fortunes

Actions on several fronts needed
- No silver bullet – combination of restructuring, productivity increases, demand stimulation, and new products required
- Possibility to build competitive edge in new products based on virgin fiber – requires sustained efforts and challenges should not be underestimated
- Now is the time to bring all stakeholders together