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# The BC Forest Products Sector in a Globally Competitive Market: Developing a Strategic Response

By  
GARY BULL  
JEREMY WILLIAMS

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### **Gary Q. Bull**

Associate Professor  
Department of Resources Management, Faculty of Forestry  
University of British Columbia  
2045-2424 Main Mall  
Forest Sciences Center  
Vancouver, British Columbia Canada V6T 1Z4  
Tel: 604.822.2150  
Email: gary.bull@ubc.ca

### **Jeremy Williams**

Arborvitae Environmental Services Ltd.  
3 Pine Crescent  
Toronto, Ontario Canada M4E 1L1  
Email: willjeremy@gmail.com

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**BC forum**  
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2045-2424 Main Mall  
Forest Sciences Centre  
Vancouver, BC V6T 1Z4  
Tel: 604.822.5570  
Fax: 604.822.9106  
Email: [info@bc-forum.org](mailto:info@bc-forum.org)  
[www.bc-forum.org](http://www.bc-forum.org)

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## 1.0 Introduction

The forest industry is one of the most important sectors of British Columbia's economy, and it is especially important in the rural and northern parts of the province, where it is a critical economic foundation for many communities. In 1999, the sector contributed 20% of the provincial GDP, manufacturing \$18.6 billion worth of products (COFI 2000). Solid wood products accounted for shipments worth \$12.2 billion (33% of the provincial total) and pulp and paper accounted for \$6.4 billion (17.3% of total production value).

Within BC, direct sectoral employment in 1999 was 90,600 people, which included people working in the logging and the wood products manufacturing industries, in forest management, and the provincial Ministry of Forests (COFI 2000)<sup>1</sup>. When combined with estimated indirect and induced employment of 181,200 people, this was equivalent to 14% of provincial employment. Direct employment in the sector peaked at 99,100 people in 1996 – since then, direct employment has declined as almost all parts of the sector experienced employment losses.

British Columbia's forest sector, like most of the Canadian forest sector<sup>i</sup>, has been struggling in recent years. While external factors, such as the on-going softwood lumber trade dispute and an appreciating Canadian dollar versus the US dollar, have played a role in the sector's recent travails, there are numerous competitiveness issues to which the BC sector can and needs to respond. Many of these factors are inter-related and include:

- The emergence of new competitors in lower cost environments that provide products of comparable quality
- Low or negative growth in demand for some key commodities in BC's major markets, such as newsprint and market pulp in North America
- Low returns on capital employed (ROCE) and consequent difficulties in stimulating capital investment (in only one year between 1992 and 2002 did the Canadian industry achieve a ROCE above the cost of capital, which is 11%<sup>ii</sup>)
- A declining allowable harvest, sparked in a large part by the transition from first-growth to second-growth timber, and the "falldown" effect that was built into provincial timber supply projections

The reduction in provincial harvest, driven in part by the falldown effect and in part by withdrawals of forestland for other uses, has been a central factor in the sector's difficulties. The peak provincial harvest, from public and private lands, occurred in 1987 according to the National Forest Database<sup>iii</sup> <sup>iv</sup>, when 90.1 million m<sup>3</sup> were harvested. While the harvest volume has recently risen due to the high volume of salvaged beetle kill wood, the provincial harvest ranged between 66 and 78 million m<sup>3</sup>/yr between 1994 and 2003, a reduction on the order of 20%. The harvest decline has been most severe on the coast. Pearse (2001) reported that the coastal allowable harvest peaked at some 28 million m<sup>3</sup>/yr in 1980, and had declined 25% to 21 million m<sup>3</sup>/year in 2001, with further declines projected to 17 million m<sup>3</sup>/year by 2040. Pearse indicated that the 17 million m<sup>3</sup> figure did not account for several large land removals, and expected that the trough in the harvest cycle would be even lower.

The interior industry has been in a better long-term condition until recently. However, the current widespread mountain pine beetle infestation is expected to create significant timber supply reductions and disruptions within the next five years, as the beetle infestation depletes the last expanses of lodgepole pine and the salvage efforts wind down. This could cause severe upheaval in the interior industry, although there is sufficient lead time to make mitigating adjustments. Further, industry has had to face additional constraints from changing land use objectives and who will pay for the continued management of these objectives remains an open question. Even without these issues, the industry is facing competitive pressures – the poor performance of pulp affects solid

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<sup>1</sup> BC Stats (2001) reported a direct employment figure of 100,900 people in 1999. The reason for the discrepancy between the two numbers is unknown.

wood producers since they obtain more than 30% of their revenue from chip sales (Roberts *et al.* 2005).

While cost cutting and incremental innovation are necessary components of the sector's response to this situation, a more strategic approach is required to lift the sector out of the doldrums. Any such response will need a strong orientation towards innovation, which was defined by Porter and Stern (1999) as the transformation of knowledge into new products, processes and services. Innovation is not only concerned with the development of technological improvements, but also involves management, marketing, and other aspects of running a company or government.

The importance of innovation is as a driver of productivity, which in turn supports higher rates of return on capital and wages. Physical productivity is traditionally determined as the quantity of production divided by the units of inputs required to produce it, but there is a quality element that this formulation does not capture. Value productivity is a broader conception of productivity and it is the dimension of productivity we are trying to increase. In value productivity we examine the value of output per unit of input, which, of course, does include the quality element. If products of improved quality can be produced with a given set of inputs, productivity can be considered to have increased.

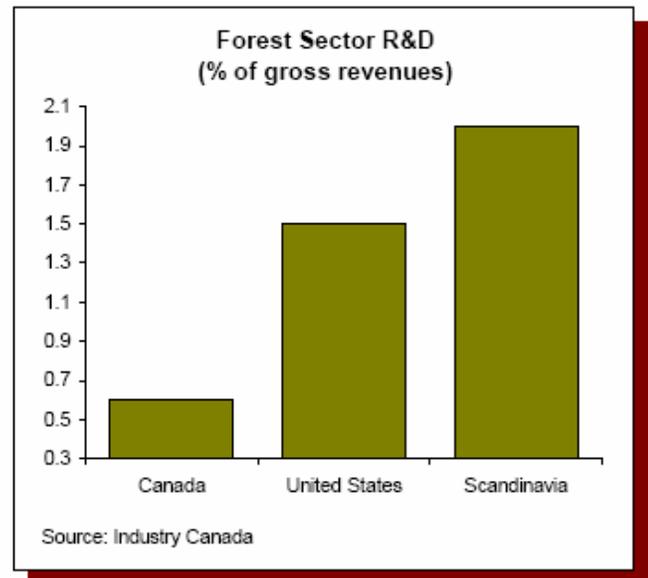
The processes and environment that supports innovation is an important component of the degree of innovation that takes place. Innovative processes are changing, due to the increasingly rapid dissemination of knowledge, globalization of trade, and the emergence of new innovative competitors. It is not enough to innovate; one needs to be more innovative than one's competitors in order to sustain a competitive advantage.

Canada's innovation performance has been mediocre and declining compared to other countries. Porter and Stern (1999) compared the level of innovation in different countries using a variety of metrics, ranging from R & D expenditures as a proportion of GDP to an innovation index. Their results show Canada in a moderate position, spending about half as much on R & D (as a proportion of GDP) as the leading countries, which include some key forest sector competitors such as Sweden, United States, Japan and Finland. Between 1983 and 1993, countries such as New Zealand, Australia and Finland increased their R & D spending at a higher annual rate than Canada. While somewhat dated, they projected that Canada would lose some ground to other countries between 1995 and 2005.

There has been greater interest and awareness in Canada in recent years concerning the importance of innovation. In February 2002, the federal government launched an innovation strategy, which aims to move Canada to the front ranks of the world's most innovative countries. Innovation within the forest sector mirrors the national situation. In a submission to the federal innovation strategy, the Forest Products Association of Canada (FPAC) observed<sup>v</sup> "The industry's R&D spending, estimated to be \$345 million in 2000, is less than half of that conducted by US competitors, and less than a third of the Scandinavian industry. In part, the smaller size of Canadian firms negatively impacts their capacity for in-house R&D, reducing the potential for developing more company unique competitive advantages. More recently, R&D adoption has been slowed by global overcapacity and low rates of return, resulting in insufficient investment in commercialization. As well, R&D efforts lack an overall strategic focus and coordination amongst the many government, research and industry organizations."

In the face of this situation, the Canadian forest sector recently began the process of developing a more strategic approach to innovation. In 2004, the Canadian Council of Forest Ministers and the Forest Products Association of Canada (FPAC) initiated the Canadian Forest Innovation Council (CFIC), which has a mandate to develop a national innovation system in the Canadian forest sector, take steps to increase R & D spending that supports CFIC's vision, strategic and operational goals, and ultimately increase the amount of R & D funding within the sector.

**Figure 1.** Proportion of Forest Sector Revenue Spent on R & D.  
Source FPAC 2002. Available at:  
[http://fpac.thinkup.com/en/resource\\_centre/PDFs/forest\\_sector\\_innovation\\_response\\_E.pdf](http://fpac.thinkup.com/en/resource_centre/PDFs/forest_sector_innovation_response_E.pdf)



## 2.0 BC Forest Sector Competitiveness Initiatives

Similarly, British Columbia has been concerned about its competitiveness for a number of years. In 1999, the BC Council of Forest Industries released a report "A Blueprint for Competitiveness: Five ideas for improving public policy affecting the BC forest industry and the people, businesses and communities that depend on it." These ideas were:

<b>1. Secure the Forestry Landbase</b>	Protecting a sizeable and secure landbase of the working forest that recognizes the need to dedicate portions of our province to growing and harvesting trees.
<b>2. Modernize Forest Practices Requirements</b>	Implementing a results and incentive-based approach to regulating forest practices that is in line with other jurisdictions and substitutes new certification systems for existing monitoring and auditing.
<b>3. Grow the Allowable Annual Cut</b>	Establishing a clear, unequivocal public objective to stabilize, then increase, the provincial AAC over time, together with the policies and programs that will make this happen while protecting environmental values.
<b>4. Enhance Tenure</b>	Providing secure, certain, long term system of tenure rights that encourages investment in our forests and allows for flexibility in business decisions.
<b>5. Improve Timber Pricing</b>	Developing a system of pricing public timber that yields a fair price to the government based on the ability of industry to pay.

While the government and the forest sector have made marginal changes under many of these areas, these are no longer suitable prescriptions for improving sector competitiveness. We note that these ideas focus on the policy environment and have a volume rather than value orientation, and they ignore other aspects that significantly affect competitiveness.

In July 2001, the Premier formed the BC Progress Board<sup>vi</sup>, an independent panel of eighteen eminent British Columbians from a variety of backgrounds from around the province. The Board is tasked with benchmarking BC over time and relative to other jurisdictions, and with providing strategic advice to the Premier on measures to improve provincial economic performance and the well-being of British Columbians. On March 29, 2005, the Premier established a Competitive Council that includes representation from key BC industrial sectors, including the forest sector, and government<sup>vii</sup> to make recommendations to the BC government as to how to improve the province's business environment. Finally, the creation of the BC Forum on Forest Economics and Policy, the sponsor for this study, is another example of the recent interest in improving competitiveness.

This background paper is one of a series being prepared on the forest sector for the BC Forum on Economics and Policy. The authors recognize that sustainability must be based on practices that are sound from economic, social and ecological perspectives, and issues discussed in other papers affect the BC forest sector's competitiveness, just as the sector's economic health affects its ability to undertake measures oriented towards social and ecological purposes. Thus, all three aspects are intertwined, as will be clear in this forest sector synthesis paper. However, we contend that while the forest sector has devoted a great deal of effort to ecological and social sustainability, it has neglected the activities that support economic sustainability.

The purpose of this paper is to identify key strategic themes that influence the BC forest sector's ability to compete, both at present and in the future. We begin by describing how some key competitors are restructuring their sector in the face of global competitive challenges, and we review the position of China and Russia, which are emerging as potential competitors but perhaps also as markets in some parts of the sector. We also examine the BC forest sector and the factors that make it unique. We then turn our attention to key themes that must be integrated in any sector competitiveness strategy.

Finally, we identify key questions and areas for further research that need to be conducted in order to better shape the development of a competitiveness strategy. Our intent is to focus on strategic areas that are within the control of the sector and the provincial and federal governments, leaving aside such external factors as exchange rates. In this way, we outline the factors that need to be considered and responded to in the emerging sectoral strategy.

### **3.0 Manoeuvres by Competitors**

In this section, we examine the activities taken by some of BC's most important competitors to maintain or improve their competitive standing. We focus on Sweden, Finland, and New Zealand. Sweden and Finland both have economically and globally important forest sectors, and each national government has concluded that a principle competitive advantage for the country must be innovation. Both Finland and Sweden have a relatively much higher expenditure on R & D than the Canadian sector (see Figure 1). Sweden is of particular interest because it is in the process of revising its network R & D institutes while Finland undertook a very successful national strategy to enhance the competitive standing of its forest sector, and is undertaking follow-up strategic initiatives. New Zealand is of interest because it is a competitor to BC in the Pacific Rim and it also has many similarities to BC – the forest sector appears to be healthy and is highly regarded, but it is struggling with a number of issues that threaten to impede its progress.

Evidence of the impact of these initiatives can be seen in the fact that Finland and Sweden are formidable industrial competitors. Table 1 shows the major Finnish, Swedish and Canadian forest products companies, their relative rankings in 2002, 2003, and 2004, and their 2004 sales revenue, in US\$.

**Table 1.** Ranking of Major Finnish, Swedish, and Canadian Forest Products Companies, by 2004 sales revenue. (US\$ billion)

Company	Country	Ranking (by sales)			Sales Revenue in 2004
		2002	2003	2004	
Stora Enso	Finland	5	5	4	15.4
UPM Kymmene	Finland	7	6	7	12.2
Svenska Cell.	Sweden	10	7	6	12.2
Metsalitto	Finland	11	11	10	10.6
Abitibi	Canada	21	21	21	4.5
Domtar	Canada	22	23	22	3.9
Canfor	Canada	51	52	28	3.3
Tembec	Canada	35	35	32	2.8
Cascades	Canada	31	32	35	2.5
Holmen	Sweden	41	37	41	2.1
Ahlstrom	Finland	39	42	45	2.0
Sodra	Sweden	56	45	48	1.9
West Fraser	Canada	64	67	49	1.8
Myllykoski	Finland	49	49	50	1.8
NorskCanada	Canada	70	63	57	1.4
Nexfor	Canada	46	38	-	1.5 *
Slocan	Canada	83	87	-	0.6 *

\* Sales revenue in 2003; Slocan was acquired by Canfor in 2004 and Nexfor was split into Norbord and Fraser Papers in 2004.

(Source: PricewaterhouseCoopers 2003, 2004, 2005)

While changes in currency exchange rates can cause shifts in sales revenue and rankings, it is clear that Finland, with a national harvest volume much less than BC's, has three of the top ten firms, and Sweden has one. Moreover, three of these companies have improved their relative ranking, while one has remained in the same position. In addition, Sweden and Finland each have two second-tier companies, which interestingly have struggled somewhat during the 2002-2004 period. Canada has six companies in the top 50 firms (NorskCanada, standing at 57-th, is shown because it is a BC-based company). West Fraser and Canfor have both substantially moved up in the rankings due to takeovers; the eastern Canadian-based companies have generally languished in their current standings for the review period.

Sweden had a domestic harvest of 84 million m<sup>3</sup> in 2002 (Skogsindustrierna 2003) and Finland had a harvest of 60 million m<sup>3</sup>; in comparison, the Canadian harvest was 164 million m<sup>3</sup> in 2002 (NRCan 2005). Clearly, the Scandinavian forest sector has become more concentrated and, at the same time, more global than the Canadian forest sector. (No New Zealand companies attained a ranking in the 100 largest firms.)

### 3.1 Sweden

The forest industry is a major component of the Swedish economy, much as it is in BC. The forest sector accounts for 4% of Swedish GDP, 11 - 12% of industrial employment, and 15% of the value of Swedish exports (Skogsindustrierna 2002). Pulp and paper is the main area of focus of the Swedish forest sector; Sweden has the third largest pulp and paper sector in Europe and is the fourth largest global exporter of paper and second largest exporter of sawnwood.

The Nordic forest industry is a main participant in the on-going restructuring of the forest industry, having been through its own restructuring. The pulp and paper and board parts of the sector went through major rationalization from 1980 to 1990, when the number of pulp mills declined from 72 to 48 (a decline of 33%), while total output increased by 4%, and the number of paper mills fell from 62 to 51 (an 18% reduction), although production increased from 7.2 to 9.5 million tones (a 32% increase). Between 1990 and 2002, the number of pulp and paper mills declined by several mills in

each industry while production rose. In contrast, Sweden has been reducing composite board manufacturing. From 1980 to 1990, the number of board mills fell from 32 to 18, and it fell further to 10 mills in 2002. The board industry now produces only 55% of the volume of products that it manufactured in 1980. It was not until the 1990's that the sawmill industry went through a major rationalization, declining from 260 mills in 1990 to 173 mills in 2000. During the same period, production rose by 45%.

As of 2002, Nordic firms own half of the Western European paper production capacity and they are moving into other areas of the world via acquisitions and mergers. However, more than 50% of the Swedish forest sector is foreign-owned. Skogsindustrierna (2003) indicates that the newly evolving companies are more focused than predecessors and concentration is increasing – ten companies account for more than 60% of sawnwood production. The industry association also notes that its products are very knowledge intensive as the industry is one of the most technically advanced in the world.

The Swedish Forest Industries Association (Skogsindustrierna 2003) describes the forest sector as being the central component of a “forest and related industries cluster” that also includes the chemical, transport, IT, engineering, and construction industries, as well as research and educational institutions. The cluster as a whole accounts for approximately 25-30% of the Swedish industry.

Sweden has a long history of industrial R & D, not only in the forest sector. The first nationally structured approach began in the early 1940's, when a national research council and five sector research institutes were set up, including a forest sector institute. During the 1950's and 1960's there was an emphasis on basic research and government, through the research council and other related bodies, played a large role in allocating research funding. Government's substantial role was justified due to the social benefits that would ultimately be derived from research and innovation, and a reluctance to have large corporations play a substantial role.

In 1990, in the face of an economic crisis, a centre-right government was elected to replace the governing Social Democrats. This government passed a number of measures to reform the way that R & D and innovation was directed in Sweden. In 1994, the Knowledge Foundation was formed, which had the mandate to upgrade the quality of graduate and post-graduate research at new Swedish universities, support knowledge exchange between industry, academia and research institutes, and promote the use of information technology (IT) (Knowledge Foundation 2004). The Foundation's Board has nine government-appointed members, including representatives from politics, universities and colleges, industry, and trade unions (<http://www.kks.se>).

In 1997, the Swedish government and the Knowledge Foundation formed a limited liability company, the Institute for Research and Competence Holding (IRECO). The Knowledge Foundation holds a 45% stake in IRECO and the Ministry of Industry, Employment and Communications holds the remaining 55%. IRECO has been central to the government's effort to corporatize the research institutes – under the new ownership structure, IRECO holds ownership stakes in each industrial research institute (Pollett 2003). Annually, IRECO flows some SEK 100 million (Can\$ 18 million) to research institutes in which it holds shares. This structure is intended to strengthen the efficiency of the whole industrial R&D system in Sweden.

There are three principle industrial research institutes that are directly involved in the forest sector: Skogforsk – the Forestry Research Institute of Sweden, Träteknik - Swedish Institute for Wood Technology Research, and STF1 - Swedish Pulp and Paper Research Institute. IRECO has minority ownership stakes in the latter two institutes, with industry owning the balance. Skogforsk was established in 1992 by forestry cooperatives and forest industry and now has over 100 members including forest land owners and administrators, forestry machinery manufacturers and haulage firms (Pollett 2003).

Two-thirds of the funding for the institutes comes from industry and the federal government provides the remainder, which is delivered through the National Board for Industrial and Technical Development (NUTEK) (Source: <http://www.irisresearch.se>).

The Knowledge Foundation's (undated) assessment of the forest sector is that to become more competitive, it needs to raise the skill level in its workforce and hire more people with post-graduate degrees and it also needs to broaden the portfolio of products that it produces. The Foundation's contribution has been to provide fifty percent of funding (industry provides the other fifty percent) for new research programs at universities, including programs focused on coating and surface treatment of paper and board, fibre technology, mathematical modeling, and the role of paper in an IT-based society. The Swedish government has also set a goal of having at least half of the people in each age group attend university and expanded places in engineering and natural sciences (Information Office at the National Agency for Higher Education 2003).

### **Consolidation of R & D**

One of the current themes of R & D organization in Sweden is consolidation, which is being done to improve the coordination of related research activities, reduce administrative overhead costs, and develop sufficient scale to leverage larger projects. Consolidation has taken place at many levels of the R & D effort, including coordinating agencies and research institutes alike.

On January 1, 2001 the Swedish Research Council (SRC) took over research support and coordination responsibilities previously handled by another coordinating council, and four other separate research councils (for medicine, engineering, natural sciences, and social sciences). The SRC is operated by the Ministry of Education and Science. There are also three additional councils of interest:

- Research Council for Working Life and Social Issues
- Research Council for Environment, Agricultural Science and Spatial Planning (FORMAS)
- Swedish Agency for Innovation Systems (VINNOVA) – established in 2002 to fund research and development that promotes innovation and sustainable development and growth

FORMAS funded 50% of the research work as Skogforsk (private landowners and industry funded the other half) while VINNOVA also funds research in each of the three forest sector institutes. Institute funding on a project or program basis comes from other agencies such as the Swedish National Energy Administration and the Foundation for Strategic Environmental Research (MISTRA) as well as grants from the European Union. The FORMAS research policy backgrounder (FORMAS 2004) noted that some have raised the issue that there is an institutional division of research along the value chain in that FORMAS funds upstream research (i.e. in the forest) whereas VINNOVA funds downstream research (i.e. processing). FORMAS answered this criticism by noting that cooperation with VINNOVA has worked well. FORMAS' most recent strategic plan emphasizes multi-disciplinary research, enhanced international linkages and cooperation, and continued emphasis on research quality. Areas of high interest include impacts of climate change, energy, biodiversity, and economic and biologically sustainable management systems. The Expert Panel also warned that there was potential for research to be overly concentrated on short-term applied research at the expense of longer-term and strategic research.

During the latter part of 2004, FORMAS retained an expert panel to review the Skogforsk research program (FORMAS 2004). The review focused on the quality and relevance of the R & D program and had generally favourable findings. Of interest were observations that Skogforsk is small in size compared with other European forest research institutes, that the Institute's publication targets were met or exceeded, and that some modification of the direction of its research effort would be appropriate. Recommendations included increased emphasis on research regarding climate change and biodiversity, cost-effective management that meets environmental and conservation requirements, optimization of the value chain as a whole while also paying attention to multiple uses.

On January 1, 2003, a merger became effective between the Swedish Pulp and Paper Institute and the Institute for Packaging and Logistics (Packforsk). This created the first of four “superinstitutes” that are planned to cover the applied research sector; Sweden plans to merge as many as sixteen separate research institutes by 2005. The new institute will be able to provide more integrated research across a wider spectrum of topic areas and will have expertise along a greater portion of the value chain, covering pulp, paper, packaging and packaging materials, and logistics. Having a larger scale, it is expected it will be more competitive on a global basis. It is also hoped that the new organizational structure will facilitate the shortening of the time required to bring an innovation to market. The press release announcing the merger noted that “material technology was the common denominator” and the new institute will be able to increase both the volume of research as well as hasten the time from research to innovation. Its program will focus on six areas:

- Fibre and pulp
- New materials and composites
- Packaging and logistics
- Paper as information bearer
- Papermaking
- Pilot plants

The new organization will have approximately 250 employees (STFI had 200, Packforsk had 50) and a budget of SEK 250 million (approximately CDN \$44 million as of April 29, 2005).

In February 2004, the superinstitute took a major step and took over its Norwegian counterpart – PFI. The takeover was agreed by both institutes’ Board of Directors, and was affected by STFI-Packforsk purchasing the shares of PFI. STFI-Packforsk will own up to 95% of the new organization, with Swedish industry and PFI owning the remainder. The reasoning behind the merger was to gain scale and become a leading international research organization, and take advantage of complementary research strength and linkages to domestic universities.

### 3.2 Finland

Finland is also heavily dependent on the forest sector for its economic well-being – with a forest area of 23 million ha, the annual harvest is roughly 60 million m<sup>3</sup> (METLA 2003). In 2002, the forest sector accounted for 6.9% of GDP and directly provided 3.9 % of Finnish employment; forest products accounted for 26% of the country’s total export revenue. When related industries such as forest and mill equipment manufacturers and parts of the chemical industry and consulting sectors are also included, the forest sector accounts for approximately 30 – 35% of the Finnish economy. Finland’s forest sector is heavily export-oriented, led by companies such as Stora Enso, M-real and UPM Kymmene. Of the forest products manufactured in Finland, from 70 – 90 % are exported. The main export market is Europe.

Finland’s forest industry appears to have expanded continually during the past several decades. In addition to the annual harvest of 60 million m<sup>3</sup>, another 16 million m<sup>3</sup> of timber is imported each year. In comparison, one decade earlier the national harvest was 50 million m<sup>3</sup>/year and imports were 7 million m<sup>3</sup>/year. Thus, Finland has been expanding its capacity; in the pulp sector, it tends to have mills that are on average both larger than average and newer than average (Roberts *et al.* 2005).

The Finnish forestry sector is heavily weighted to paper production, with more than 70% of the value of production of the sector coming from pulp, paper and paperboard. Most of Finland’s forests (53.5%) are owned by private non-industrial landowners, with an additional 7.8% being owned by industrial interests (METLA 2003). The remainder are state-owned. The national Ministry of Agriculture and Forestry oversees forest policy and the development and implementation of national programs; a National Board of Forestry supervises private and managed state forests.

Since the 1960's, Finland has undertaken a series of large national programs aimed at bolstering the forest sector. There are programs which are aimed at the development and management of the forest resource, and programs which are aimed at improving the competitive position of the forest industry.

One of the earlier forestry programs was implemented during the 1960's and 1970's when, in response to overharvesting, the government launched a program to increase the future harvest by improving management of the existing forest and increasing the commercial forest area (Finland Ministry of Agriculture and Forestry 1999; Bull and Schwab 2002). The program's goal was to double landowner and government expenditures on forest renewal and management. In addition, roughly 5.5 million ha of peatlands and wetlands were drained and slow-growing trees were replaced with faster growing species. These efforts led to a higher wood supply and harvest level. Between 1985 and 2000, the Forest 2000 program was implemented, which was intended to increase forest harvests by about 3 % per year, while conserving forestland for recreation and other uses. It also called for enlarging the average size of private forest holdings, increasing the area used for forests, and extending forest cultivation and thinning (United States Government 2005).

During the 1990's, national forest legislation was overhauled to reflect the principles of sustainable forest management and strengthen conservation efforts. In 1997, three important pieces of forestry legislation were passed: a new Forest Act which regulated logging and post-harvest renewal, a Sustainable Forestry Financing Act, and a Nature Conservation Act. To support conservation on private lands, a sum of EU 600 million was set aside for 1996 – 2007, which was partially funded by sales of government land.

In 1998, the Finnish government developed and implemented a National Forest Programme that is to run until 2010. Broadly speaking, the plan is to encourage the evolution and competitiveness of the forest industry, ensure that national forests (all ownerships) are managed using sound, sustainable practices, and provide recreational and other social benefits from forests (Finland Ministry of Agriculture and Forestry 1999). The premise is that a competitive market for timber and other forest products will underpin sustainable forest management.

The principle goals of the National Forest Programme are:

- A competitive forest industry and the renewability of forests provide the basis for a sustainable forest sector
- Maintain competitive conditions in the forest sector and increase the domestic use of wood by 5 – 10 million m<sup>3</sup>/yr by 2010, and double export revenue from the sector by 2010
- Increase the domestic forest harvest to between 63 and 68 million m<sup>3</sup>/year by 2010, maintaining high silvicultural intensity and sustainability.
- Increase the use of wood energy by 5 million m<sup>3</sup>/year by 2010
- Achieve a favourable standard of species and ecosystem conservation.
- Maintain traditional forest uses to provide cultural and spiritual benefits.
- Improve forest-based knowledge through innovation, education and an expanded international activity
- Participation in international forest policy development and co-operative research programs

An economic analysis of the program's expected impacts forecasts an increase in government net annual revenues of 0.8 – 1.5 billion, while yearly export revenue will rise by between EUR 1.7 – 3.4 billion EUR, half of which will be achieved through volume increases and the other half through increased average unit value of production. While the forest sector workforce is expected to decline from 95,000 to 80,000 in 2010, the National Forest Programme (NFP) is expected to prevent a more extreme decline by supporting an additional 10,000 to 15,000 jobs than would otherwise be the case.

Perhaps the most relevant parts of the program are related to innovation and internationalization. The NFP intends to increase R & D spending in the sector and the government views its roles as primarily supporting forest-based R & D (the private sector has primarily responsibility for industrial R & D) and facilitating R & D that is more efficient and better meets the needs of customers. To assist, the government planned to establish a forest sector Innovation Forum which is intended to create better interaction between researchers and end users, set targets for R & D development and implementation, and forecast future areas where innovation would be particularly beneficial. Improving the uptake of R & D, especially at small and medium-sized enterprises, will also be an area of focus. (A mid-2002 review of the NFP found that the Innovation Forum had not yet been established.)

On the industrial side, Finland initiated a broad national program for the forest sector in 1996. This program was driven primarily by the Ministry of Trade and Industry, with considerable support from the National Technology Agency (TEKES). The year 1996 was declared to be the “Year of Wood” and a committee chaired by the country’s president developed a roadmap for the sector.

One outcome was the establishment of the Finnish Forest Cluster Research Program, Wood Wisdom, one of eight such clusters in Finland. Running from 1998 to 2002, Wood Wisdom was intended to strengthen and accelerate forest sector innovation by overcoming institutional barriers and linking research closely to the users of research results. Wood Wisdom acted as a co-ordination and funding network focused on “the market-driven use of Finnish wood raw material in optimal wood and paper products” and “integrating forestry and other parts of the production chain (Pollett 2003).

The roadmap also yielded a major program called “Time for Wood”. This program ran from 1997 to 2000 and included a sector-wide, two-pronged approach. One prong was called “Building with Wood” and it emphasized the development of new solid wood building products and modules. The “Living with Wood” prong was designed to encourage greater consumption of wood in everyday life, such as in the living spaces of houses and offices, in walls, floors, ceiling, furniture, etc. Key to the success of these programs was working with the right people – the Living with Wood program engaged designers and market analysts, as well as standard sector representatives. In addition, several town blocks or sectors were built using wood as the main construction material and a number of showcase buildings and developments were constructed (Sandberg 2005). The Living with Wood segment concentrated on developing a national market for Finnish forest products design and once established at a reasonable degree of strength, the Finnish design companies were able to market into other countries. As a result of this initiative, domestic wood use doubled on a per capita basis.

The initiative was followed up by a program from 2001 – 2005 called WoodEurope, chaired by the Minister for Trade and Industry. This program is intended to jointly, with other European countries, promote the use of wood, continue to support national wood use and design, and leverage the domestic industry to develop export markets for Finnish products in Europe. Finland is working with the Baltic countries and Western Russia to introduce the Time for Wood promotions into those countries. In addition, the TEKES initiated several associated technological support programs. WoodEurope is associated with a broader European initiative to double the per capita consumption of wood from 0.2 m<sup>3</sup>/year to 0.4 m<sup>3</sup>/year by 2010.

Finland has been active in collaboration with forest research organizations from other countries, especially with Sweden and more recently through the European Union. Building upon the earlier Wood Wisdom program, a joint Finnish-Swedish Wood Material Science Research Programme has been undertaken, starting in 2003 and running to 2007. This program is being funded in Finland by the Academy of Finland and TEKES, and through Formas and VINNOVA from the Swedish side. This EUR 20 million initiative is intended to improve the competitiveness of both countries’ forest sector, developing innovative, eco-efficient, and cost competitive products, processes and services (Wood Material Science Research Program 2005). There are two sub-programs. The basic research receives public funding of EUR 4.2 million, with industry providing funding equivalent to 30 – 50% of total funding. Basic research projects include:

- Identification of the genetic basis for wood quality related traits in birch
- Impacts of wind on wood characteristics
- Value-chain integration and analysis
- Impact of forest management and climate change on wood quality
- Improved technological use of Scots pine fibre
- Wood quality assessment methodologies
- Chemical microanalysis of wood tissues and fibres
- Fibre wall modeling to understand fibre strength – paper strength relationships

The second sub-program undertakes targeted R & D (Wood Material Science and Engineering Program, 2004) and received public funding of EUR 7 million, with industry supplying another EUR 4 – 7 million. Main projects include:

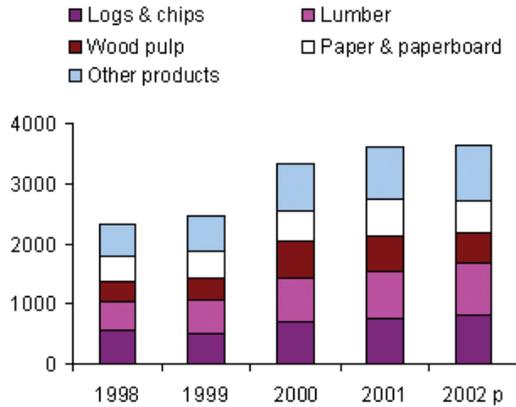
- Obtaining fine chemicals from bark
- Cellulose derivative products for high-value applications
- Tailored cellulose nanostructures
- Improving the performance of wood polymer-based composites
- Modified wood products for building and joinery uses
- High-fire performance wood products
- Long-span wood structures
- Expert system for optimizing the use of wood in end products

In 2004, a three year program called WoodWisdom Net was implemented to layout the framework for a larger European WoodWisdom project that will be focused on wood material science and wood engineering, starting in 2007. This signals that the Finnish are extended their R & D approach of increasing concentration, horizontal and vertical co-operation, and leverage of R & D resources.

### 3.3 New Zealand

The New Zealand forestry industry is principally made up of plantation forestry, pulp and paper and other large-scale processing operations, sawmilling and solid wood products manufacturing, and consultancy and engineering solutions sectors. There is also a very small but potentially quite valuable sub-sector based on sustainable management of indigenous forests, with the wood harvested being processed in New Zealand into high value finished products such as furniture. As shown in Figure 2, New Zealand forest product exports expanded steadily from 1998 to 2002, with estimated export revenues being NZ \$3.68 billion (equivalent to C\$3.09 billion). The 2002 revenue breakdown by main export was:

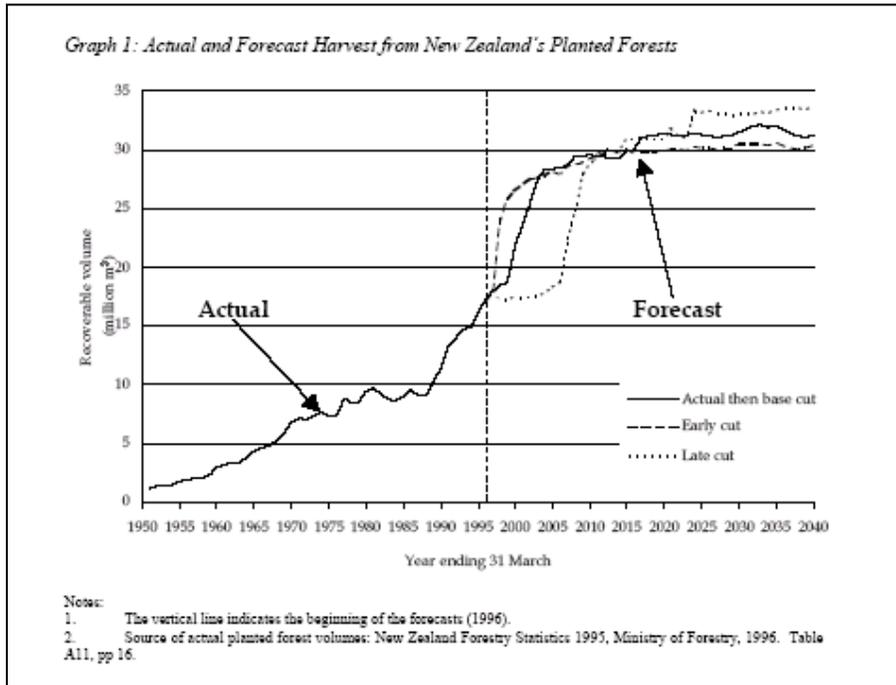
- Lumber (sawn timber): \$920 million (C\$772 million)
- Logs: \$809 million (C\$680 million)
- Paper products: \$511 million (C\$430 million)
- Wood panels: \$539 million (C\$453 million)
- Wood pulp: \$491 million (C\$412 million)
- Other products: \$412 million (C\$346 million)



**Figure 2.** New Zealand forest product exports sales revenue (years ended June) (NZ\$ million fob). Source: Statistics New Zealand

New Zealand is a small player in the international forest industry, accounting for 1.1 % of the world's total supply of industrial wood and 1.3 % of the world's trade in forest products. In comparison, Canada accounts for 18.8 %, Sweden 8.2 %, Russia 2.2 %, and Chile for 1.1 % of trade. New Zealand exports forest products largely to Australia, the US, and key Asian markets such as Japan, Korea, China and the Philippines. Australia has historically been New Zealand's major export market for structural building components; however, it is becoming increasingly self-sufficient in softwood lumber and its overall forestry competitiveness is improving. In 2002 the US overtook Australia as New Zealand's main export market for lumber both in volume and value terms. The largest markets for New Zealand log exports are Korea, China and Japan, followed by India and the Philippines. An increasing volume of the logs exported to China is processed into higher value added products such as furniture and re-exported (Brown and Ortiz 2001).

New Zealand's forest industry relies primarily on radiata pine for its raw material, which makes up 89 % of New Zealand's 1.81 million hectares of plantation forests. The industry's competitiveness is based to a great extent on its fast growth rate and its suitability over a wider range of sites. Radiata's advantages include versatility, suitability for preservative treatment, and good painting, gluing and machinability and excellent finishing/sanding properties. It is suited to medium density fibreboard (MDF) because of its colour, and has some strength advantages in newsprint and paperboard. As Figure 3 shows, the radiata harvest will increase substantially as more plantations mature.



**Figure 3.** Actual and Forecast Harvest from New Zealand's Planted Forests Source: Brown 1997

Unfortunately, radiata also has a number of critical weaknesses, including its high variability in wood quality, both within tree and between regions, poor natural durability and lack of dimensional stability and hardness. This means that in applications where these factors are critical, it is vital that radiata is appropriately processed, handled and utilized.

Based on an exchange with a number of influential New Zealand consultants (Brown, Hammond, Perley 2005), our conclusion is that radiata is a medium-value timber that, when sorted and /or pruned, can be processed into some higher valued products. For example, with specialized drying, chemical or processing treatments (e.g. fingerjointing or laminating), at some cost, radiata could substitute for some better quality timbers in construction and outdoor uses. However, unsorted or lower quality radiata does not command a premium price and New Zealand has been selling it as low-grade packaging timber. This has undermined the pricing on this timber, which has contributed to a worsening perception of the species that is already negative. This has led New Zealand to question the value of its plantations, and is one reason why planting has recently declined dramatically.

The New Zealand government privatized its plantation holdings in the mid-1990's and now 92% of plantations are privately owned, with major forestry owners including Carter Holt Harvey (CHH), Fletcher Challenge Forests (FCF), Rayonier and Weyerhaeuser. Over 40 % of the plantation resource is owned or managed by companies wholly or majority-owned by overseas interests. About 14 % of plantation forests are on Maori-owned land. Most forests on Maori land are owned by non-Maori and managed without the involvement of the Maori landowners. Since the early 1990s, much of the new forest planting has been by a large number of small-scale independent forestry owners, and consequently these owners will play an increasing role in the sector as their forests reach maturity.

New Zealand's large-scale pulp and paper sector is not very vibrant and appears to be losing market share (Brown and Ortiz 2001). Although there have been substantial upgrades (i.e. extensions and redevelopments of existing processing plants), there have been no major new greenfield investments in pulp and paper in the past 15 years. There has been some growth in MDF and LVL production. Pulp, paper and other large scale processing tends to be capital and energy intensive and future prospects depend on factors such as the availability of large-scale capital investment, regulatory issues, wood fibre costs, security of supply and energy costs.

The sawmilling industry utilises over 7 million m<sup>3</sup> of wood per year and supplies more than 3 million cubic metres of residues per year to the pulp, paper and panel sectors. It is a critical part of the New Zealand forest industry in that it adds considerable value, is proportionately a large regional employer, and has been instrumental in opening new markets for radiata. The sawmilling sector has traditionally relied on the domestic and Australian markets, both of which are now mature. Australia is producing more of its own lumber and is expected soon to become self-sufficient.

New Zealand has not been successful at developing a wider forestry industry cluster, comparable to those developed around the forestry industries of countries such as Finland and Sweden. However there is considerable potential for growth, for example in timber-drying kilns and process control systems.

New Zealand's forest industry has growth potential. The Ministry of Agriculture and Forestry (2003) claims that New Zealand is developing an international reputation as a leading-edge nation in some aspects of wood-based product manufacturing. There may also be growth potential from knowledge-based products (e.g. consultancies, licensing, research, education etc.) and allied innovative products (e.g. processing machinery, control systems, wood-based chemicals and new wood-based products).

However, it should be stressed that there are major impediments to the industry fulfilling its potential. Resource dispersion, infrastructure and environmental constraints, limited skills, a poor image of radiata pine, and lack of investment in wood processing continue to limit industry growth.

There are also risks to its current performance, and a lot of effort may be needed to ensure the industry does not go backwards (Brown and Orbitz 2001).

The New Zealand Forest Industries Council (NZFIC) notes that New Zealand's wood fibre-based products face significant hurdles relative to competing materials. New Zealand's distance from market will continue to make commodity-based trading difficult to sustain. The inevitable increase in wood volumes reaching maturity, coupled with the current international political and economic uncertainty, will require the New Zealand forestry-based sector to access new markets and to develop innovative wood-based solutions in order to survive and thrive in the future. The necessity to link research with market needs will be critical to achieving such success. Without innovative products and processing operations that meet current or expected market demands, the processing and manufacturing industries are unlikely to attract the necessary investment required to capitalize on the huge potential that the expanding resource offers. The industry has concluded that without substantial RS&T investment the industry will remain trapped in the old value chain and dominated by commodity products (NZFIC 2001).

New Zealand has embarked on many strategic initiatives in the past decade, many of which may or may not still be in force. In 1997/98 a strategy was prepared to define the major infrastructure-including a research, science and technology strategy (RS&T strategy) - required to meet the needs of the forest sector over the immediate and intermediate term.

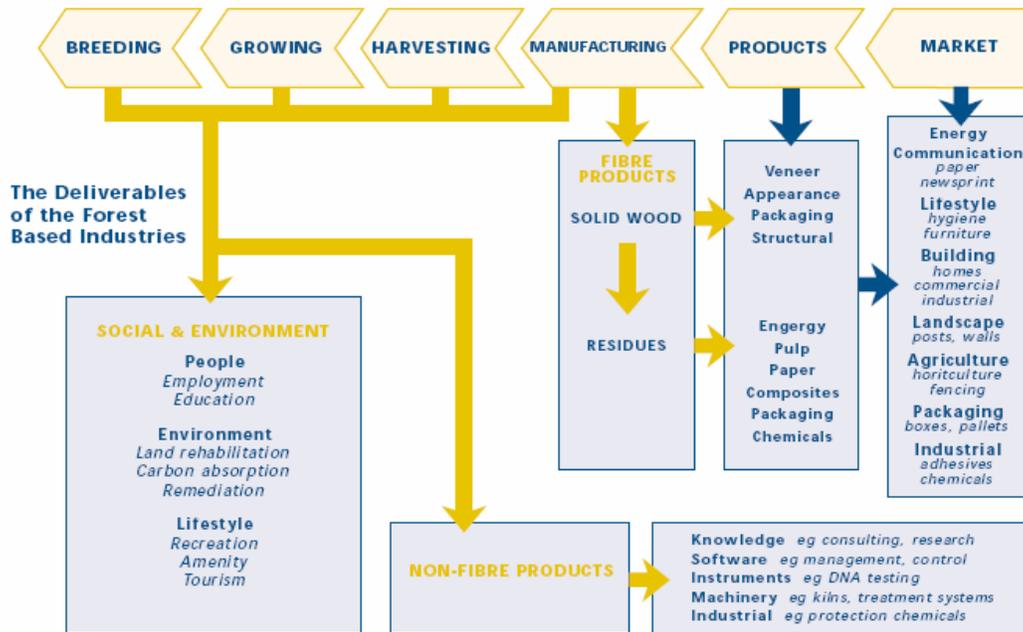
The New Zealand Forest Industries Council also created an industry vision statement. It states: "The aim is to grow the industry into New Zealand's No. 1 industry by 2025 – that is to create a \$20 billion industry." Their three strategies to achieve the vision are:

- Maximize returns from the existing resource – bringing a focus on efficiency and future customers to the existing value chain
- Create the 'resource' of the future – substantially transforming the existing value chain into a new value chain which is not locked into the past
- Develop related and supporting industries that add value to the existing value chain and provide new value in their own right

The first two strategies are guided by Strategic Market Intelligence and supported by a number of industry-wide initiatives directed by a Wood Processing Strategy (developed in 2001) between government and industry. The third strategy included mechanisms to engage industry in directing and prioritizing research. It will provide leverage and focus for industry and government funds by 'partnerships'. The purpose of these industry strategies<sup>viii</sup> is to:

- Deliver technologies to industry that capitalize on the value added opportunities of the existing resource
- Measure the value of Research, Science and Technology spending
- Manage a portfolio of research activities
- Build and maintain competitiveness and capabilities

Figure 4 represents the value chain of the New Zealand forest industries. The value chain is not only about processing timber into solid-wood and fibre products. The industry contributes significant value in the social and environmental spheres for New Zealand, and these encompass a number of target outcomes. It also provides the basis for knowledge-intensive development throughout the value chain and the development of non-fibre value both within the existing industry and in related and supporting industries.



**Figure 4.** Value chain of the New Zealand forest industries.

A framework for presenting the RS&T platforms to give effect to the sector vision is shown in Figure 5. The research is guided by the concept of Strategic Market Intelligence. The platform is divided into activities based on the existing resource and the future resource. This division is particularly useful in forestry because of the long lead times in growing the resource.



**Figure 5.** Organization of innovation in NZ forest sector.

Research is grouped into three horizons:

1. Business as Usual - research focused on supporting or defending a business/sector's current position
2. Added-value - research focused on enhanced product performance, differentiation, or improved functionality
3. Transformational - research focused on creating opportunities outside the realm of the business or sector's existing operations

The pan-industry research platforms are of industry-wide importance and are suitable for industry direction and increased funding. The strategy recognizes the need for:

- (i) a partnership approach in funding the research platforms, and
- (ii) different funding ratios (Industry:Government), funding mechanisms, and industry input into each horizon

In very general terms the Government of New Zealand's objectives for its share of R&D funding are:

- enhance the capacity of New Zealand businesses to adopt innovations
- improve the international competitiveness of enterprises
- protect the environment through better knowledge of biophysical systems
- advance the well-being and inclusiveness of New Zealand society [Ministry of Agriculture and Forestry. 2003b].

New Zealand has developed a variety of sector strategies in an effort to better position the sector internationally. These include the Wood Fibre SolutionNZ<sup>ix</sup> initiative which complements and extends the RS&T Strategy by providing a strategic framework which:

- Profiles some of the critical issues that the sector faces
- Documents key Principles and Outcomes required to realise the sector's potential
- Outlines the processes by which these strategies will be implemented, and the competencies required to deliver on the desired outcomes defined (New Zealand Forest Industries Council 2001).

In 2002, the Wood Processing Strategy was replaced with a Forest Industry Framework Agreement (FIFA), which has been derailed by differences of views between the industry and landowners on carbon credits and deforestation. Towards the end of 2004, the Forest Industries Council, the Forest Owners Association and the Farm Forestry Association put forward a new, amended proposal that suggested the government address industry development and carbon policy issues separately. In 2005, this led to the creation of FIDA (Forest Industry Development Agenda) as a new relationship between the forest and wood processing industry and the government. It will see the government invest \$18.1 million to develop the industry starting in 2005, with a further \$3.8 million contribution expected from industry. Areas to be funded include: market access (\$1.2 million over five years), market development (\$8 million over four years), bio energy (\$2.5 million over five years), skills and training (\$4.4 million over five years) and wood design (\$2.0 million over five years).

Although the New Zealand sectoral "partners" have developed a series of frameworks and strategies for industry development and for research, science and technology, the number of changes in nomenclature that have been introduced since 1997 suggests that the implementation has been challenging. Further, the budgets assigned do not indicate a significant investment in research, science, and technology thus far.

New Zealand is one of few developed countries with an increasing wood supply available at a relatively low cost. However it has been a conundrum that processing capacity has remained well below the available harvest level, which has led to a large log export business. The lack of significant expansion in capacity can be attributed to a range of factors including expensive and time-consuming government regulatory requirements, and high transportation and labour costs relative

to the value of readily producible products. It would also appear that there is a certain level of risk aversion or complacency within the industry that has hindered further development. These factors combine to create a relatively high risk associated with a limited potential reward.

## 4.0 BC Forest Sector - Driving Forces

Of the many factors influencing the evolution of the BC forest sector, there are seven that we have identified as being key current themes or driving forces. These themes will have a significant impact on the outcomes of different strategic alternatives, and as such need to be understood and considered carefully in developing a BC forest sector strategy. The themes we have identified are:

1. Industry Consolidation
2. Accelerating Technological Change
3. Emergence of Alternative Uses of Wood
4. End of Low Cost Traditional Sources of Energy
5. Social and Environmental Requirements To Be Successful
6. Institutional Arrangements and Governance
7. Changing Competitive Landscape

These themes are all global, in the sense that every company in the international forest sector is grappling with them in one form or another. Some of these themes cut across the entire economy, such as the rising importance of energy, while others are specific to the sector (emerging alternative wood uses). There are some commonly cited factors, such as currency exchange rates, that are very important but are not listed above. The difficulty in predicting their moves makes it unwise to tailor a strategy to forecast changes in such factors. Instead, the most robust strategies should be able to take advantage of whatever future exchange rate conditions arise, whether it be a rising Canadian dollar versus the US currency (which would make acquisitions denominated in US dollars more attractive) or the opposite, which would increase the profitability of Canadian companies. Similarly, we have not identified the softwood lumber trade dispute as a driving force – we feel that the dispute will be a lasting (or at least recurring) feature of the export market and various strategies are available to neutralize its impacts.

Each of the themes is discussed in more detail below, focusing on the reasons why each is a key theme for the BC forest sector as well as identifying some of the strategic options available.

### Theme # 1- Industry consolidation

There are two relevant, related aspects of industry consolidation – the first being larger companies buying or merging with smaller companies, and the second being the closure or upgrading of small, older wood processing facilities. These two aspects are related in that acquisitions can facilitate the closure or refocusing of disadvantaged processing assets, while companies that primarily own low quality assets tend to be acquired.

We would like to emphasize that we are not advocating that all companies should be large, but rather we are pointing out that the largest BC-based companies are of relatively modest size within the global industry (Roberts *et al.* 2005), and we feel it is desirable that the large BC companies continue to grow. This is especially so since the largest companies in the global sector are only getting larger. As we describe more fully below, we feel that further growth of BC companies will have to come from acquisitions outside BC. Finally, we also think that there is opportunity for growth in the value of produced goods.

Roberts *et al.* (2005), who also identified consolidation as a key trend in the sector, noted that Canfor, after its acquisition of Slocan, ranks 35<sup>th</sup> in size, by sales, internationally. The largest company,

International Paper, has ten times the sales that Canfor has. Table 2 shows the major Canadian companies, listed in terms of 2004 sales revenue.

**Table 2.** Largest Publicly Owned Canadian Forest Products Companies, Ranked by Sales

Company	Year	2004 Sales (billion \$Cdn) *	ROCE (%) **
Abitibi	2004	5.8	6.9
Domtar	2004	5.1	5.2 <sup>x</sup>
Canfor	2003	4.3	19.8
Tembec	2004	3.7	4.0 <sup>xi</sup>
Cascades	2004	3.4	6.5 <sup>xii</sup>
West Fraser	2004	2.4	10.1 <sup>xiii</sup>
Catalyst Paper	2004	1.9	0.9

Notes: \* All sales revenue data from 2004 company annual reports.

\*\* ROCE figures for Abitibi and NorskeCanada were not found in company annual reports; avg. ROCE figures for 1998-2003 from Roberts *et al.* (2005). Roberts *et al.* (2005) data were also used for Domtar and Cascades.

According to Roberts *et al.* (2005), the largest Canadian company, Abitibi Consolidated, is 21<sup>st</sup> in size in the global sector, as measured by sales revenue, while Canfor is 35<sup>th</sup> and West Fraser is about 12 places further behind. Note that Canfor and West Fraser are Canadian owned companies based in BC, Catalyst Paper is a publicly traded company that operates in BC and is 29.4% owned by Norske Skogindustrier ASA, a large multinational Norwegian company. Abitibi, Cascades and Tembec are based in Eastern Canada but all have operations in BC.

While the largest Canadian companies are of a reasonable size, most are not particularly healthy, as evidenced by the low return on capital employed (ROCE). With the cost of capital being 10 – 13% (Roberts *et al.* 2005), most companies cannot cover their capital costs. (Notably, the exceptions are the two companies focused on solid wood products – Canfor and West Fraser). Pearse (2001) considered the coastal forest industry to be in crisis, experiencing declining and mostly negative profit, low levels of investment and deteriorating plant and equipment, spare capacity and very high costs.

As both Pearse (2001) and Roberts *et al.* (2005) point out, with sub-par returns the industry has difficulty attracting investment, which makes it doubly difficult to upgrade low quality assets. Roberts *et al.* (2005) noted that the ROCE in BC averaged 5.2% from 1998 – 2003, and Pearse pointed to very low ROCEs in the Coastal segment of the sector.<sup>xiv</sup> These results are below the average ROCE of 5.5% in the Canadian sector as a whole, and well below the 7.0% achieved in Latin and South America, where most new investments are being made. Significantly, rates of return in other developed regions were higher than in BC (e.g. Europe = 6.3%).

The impact of low ROCEs showed up clearly in the re-investment ratios, which reflect the value of capital expenditure versus depreciation. A re-investment ratio greater than 1.0 indicates that the capital stock is being expanded, whereas a ratio below 1.0 indicates that the capital stock is being depleted. PricewaterhouseCoopers (2005) calculated that from 2002-2004, Canada had the lowest re-investment ratio, averaging about 0.5.<sup>xv</sup> Europe, US, and Japan also had re-investment ratios below 1.0 during this period, while Asia-Pacific, Latin America and South Africa, buoyed by a very strong 2004 in which the re-investment ratio approached 2.0, had an average well in excess of 1.0.

There are two principle factors driving consolidation, which is a worldwide trend evident in all sectors. The first is that scale, which has largely driven by the size of the suppliers and retailers, confers a number of advantages in a global market, and many other forestry companies are expanding to obtain these advantages. BC's competitors are doing this, and BC companies have been active in this regard. Recent merger and acquisition activity in British Columbia includes:

- 1999 – Weyerhaeuser acquires MacMillan Bloedel
- 1999 - Canfor acquires Northwood

- 2000 - Norske Skog purchases Fletcher Challenge Canada. The Canadian operations are renamed NorskeCanada
- 2001 - NorskeCanada adds the paper-making operations of Pacifica Papers at Powell River and Port Alberni to its holdings
- 2004 - Riverside Forest Products acquires Lignum Ltd.
- 2004 - Canfor acquires Slocan Forest Products
- 2004 - Tolko Industries Ltd acquires Riverside Forest Products
- 2004 - West Fraser Timber Co Ltd. acquires Weldwood

In addition to the mergers and acquisitions listed above, there have been numerous transactions involving mills and timberlands, most notably the purchase of coastal Weyerhaeuser operations by Brascan in early 2005.

However, based on what has happened in other parts of the forest sector, the consolidation trend has a considerable way to go in the areas of solid wood products and pulp. Roberts *et al.* (2005) reports that these are the two least consolidated parts of the North American forest sector; the top five producers have less than 30 and 40% of total North American market share, respectively. In contrast, the top five producers of most paper grades and OSB have more than 70% of the market.

The second principle factor driving consolidation is that the new processing facilities being built are generally larger and more efficient than older facilities, which leaves the older facilities at an increasing disadvantage. Roberts *et al.* (2005) report that new pulp mills are being built with production capacities of 1 million tonnes per year. In contrast, most mills in BC produce on the order of 200,000 - 300,000 tonnes/year. In the solid wood sector most older mills eventually close and existing production is often distributed to other mills in the region. A company owning several mills in a region can frequently close the highest cost mill and re-direct the timber to its other mills, maintaining production but lowering overall cost<sup>2</sup>.

Other advantages that accrue to scale are:

- Ability to lower per unit overhead costs and operating costs such as transport, and ability to use assets more efficiently
- Increased purchasing power – more flexibility in timber harvesting and directing wood to mills, greater power when negotiating with equipment suppliers
- Greater selling power – more reliability and greater ability to negotiate with large retailers and other purchasers
- Ability to borrow money at a lower interest rate – important in a capital intensive business (Roberts *et al.* 2005)
- Larger company value provides greater ability to withstand ups and downs of the economy and forest products markets specifically
- Better ability to fund and benefit from innovation (classical economic argument)
- Improved platform for expansion - greater ability to purchase assets in US or elsewhere
- Greater choices in how to use assets, however this can be constrained by governments
- Obtain a broader management perspective – large BC companies are currently either BC or BC/Alberta oriented

Roberts *et al.* (2005) also assert that price volatility is lower in more consolidated sectors, even if long-term average prices are not greatly affected.

To summarize, because there are advantages to increased scale, and because BC's competitors are consolidating, we believe that this trend will continue to be influential in affecting the BC forest sector and the competition it faces. We think that consolidation can offer many advantages to the

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<sup>2</sup> The tendency in the sawmill sector is towards 'supermills' but the economics of these mills in contrast to smaller mills warrants further investigation.

sector, if it is allowed to proceed based on business needs and if BC companies are encouraged to be the consolidators. Before discussing this further, we consider the impacts of consolidation on individual mills and communities.

While it is fine to describe the benefits of consolidation, the resultant closures of mills and machines are painful for the affected communities and employees. Unfortunately, while there have been many mill closures in BC during the last two decades, there are likely more to come.

The majority of closures have been on the coast, which is where the industry first began and so many of the oldest mills in the province are located there. The coastal timber supply has also experienced the most significant declines within the province, and the industry is in transition to reliance on second growth forests for the majority of its wood fibre. Both of these factors have aggravated the loss of facilities on the coast.

Pearse (2001) reported that between 1997 and 2001, eight large sawmills, one pulp mill and two board mills have closed in the region, and many more are “temporarily” shut down or have suspended operations. During the 1990’s, coastal logging employment fell by 5% (approx 600 jobs), sawmill employment by 40% (approx 5,000 jobs) and pulp and paper employment by 36% (approx 3,400 jobs). This followed 50% declines in the 1980’s.

Both Pearse (2001) and Roberts *et al.* (2005) point out that the forest industry has very high barriers to plant closure, especially pulp and paper facilities, usually because the closures take place in remote communities that have few other industries and few prospects. This is illustrated clearly by the continued government efforts to keep the Skeena mill in Prince Rupert operating. Government often tries to keep mills from closing because it knows there are usually few alternatives available. Sometimes these efforts have been successful (e.g. the former Spruce Falls mill in Kapuskasing, now owned by Tembec, has operated since it was bailed out in 2004, but is reportedly in difficulty now that a ten-year energy agreement has expired). Worker re-training programs can be effective for younger employees and a few older ones, but most middle-aged or older employees cannot adapt well. In these circumstances, we feel that the best approach is to improve the approaches to dealing with mill closures.

### **Prognosis for the Future – Continued Consolidation**

As described above, we believe that there are many reasons for consolidation in the BC forest sector to continue. The recent elimination of appurtenancy clauses in forest licences removes one significant impediment to the closure of uncompetitive mills, and there are still a number of older and smaller mills that are likely to close<sup>xvi</sup>. This can be expected to put downward pressure on total North American production levels – Fraser Papers (2005) noted that since 2000, more than 4 million tons/year of fine paper capacity and 2 million tons/year of groundwood papers have been closed or idled in North America.

As noted, a fair amount of consolidation has already taken place. Within BC there is a regional concentration of companies, with two companies dominating in the coastal region, two in the northern Interior, and one in southeast BC. Further consolidation within BC among the large companies would raise concerns about the lack of competition; thus, we believe it is unlikely that the remaining big BC companies will try to buy each other. Hence, further consolidation will mean that BC companies either buy companies in other jurisdictions or are bought by companies in other jurisdictions.

There are good reasons for Canadian companies to purchase external assets, with the U.S. being the logical place to consider. Two important reasons are market access and geographical diversification, both of which can be facilitated by expansion into the U.S. Once a company has a strong North American platform, it is better able to expand to other parts of the world. The American culture is also quite similar to ours, which improves the likelihood of a successful expansion, and of course the Canadian dollar has appreciated, making U.S. assets as inexpensive as they have been for years.

Another factor that can be expected to lead to structural change in the industry is the impact of the mountain beetle infestation. It is anticipated that the high salvage harvest levels should begin to drop off by 2008 or 2009, leaving the interior with a greatly reduced AAC. This has a strong potential to lead to mill closures, but because this will not affect the area for several years, there is time to develop plans to minimize the impacts. At the same time, the prospect of a large decline in wood supply is expected to stimulate the companies that are based in the interior to expand, either elsewhere in Canada or more likely into the U.S.

Finally, we note that the trend to consolidate will not necessarily mean that forest products firms become conglomerates active in many parts of the forest products markets. There is growing disillusionment with the standard business model of firms that are both vertically and horizontally integrated; the emphasis is on core competencies and jettisoning assets or operations that do not provide a suitable rate of return. The reason that integration is being considered more carefully is that there are no synergies or economies of scale between lumber production and pulp production, for example. While it is advantageous to have a captive chip supply, in a world where there are active chip markets this becomes less important. Following this logic, some companies have sold off their woodlands and other companies, such as Nexfor, have split into multiple components. Thus, the re-positioning of asset bases following consolidation does provide opportunities for accretive growth.

### **Major Issues Regarding Consolidation**

Given the above prognosis, we feel that the key issues for a BC forest sector strategy are:

- For the provincial government to work with industry, communities and other stakeholders to better manage consolidation without blocking it;
- Change tenure systems to increase investment opportunities;
- Improve management of the community impacts of consolidation;
- Create conditions that will allow the formation of globally competitive forest products companies headquartered in BC, while not disadvantaging mid-tier companies;
- Proceed with reallocation of rights with Defined Forest Area Management (DFAM) to create area-based licence agreements;
- Facilitate regional wood supply management to allow larger companies to match regional factors with regional wood supply, while not sacrificing the financial or ecological value of the resource; and
- Support for innovation and other changes that can facilitate competitiveness, since many of the larger players in the BC pulp and paper market are in a relatively weakened position

## **Theme # 2 - Accelerating technological change**

Since Alvin Toffler's Future Shock described the acceleration of technological change, this widely accepted phenomenon has affected all sectors. There is no reason to expect this characteristic of our society to change in the foreseeable future.

Technological change means more than simply inventing new products or technical processes. Innovation may also be found in marketing, financial management, policy, re-organization of workplace, and other areas that are not usually considered as being amenable to innovation. Governments and other institutions and organizations may be innovative – it is not just industry that is expected to improve its ways of doing things. There are also important elements related to effective adoption of technologies that are often overlooked but are necessary to ensure that the benefits of improvements are realized.

Technology has played an important role in recent years in shifting the competitive balance between softwood and hardwood pulp – through technological improvements, hardwood can be used to create pulps and papers with overall quality that is comparable to softwood. Now that hardwood pulp is much more competitive with softwood pulp, the price differential has narrowed

(hardwood pulp has risen towards the softwood pulp price) and investment dollars are flowing to hardwood producers in order to take advantage of hardwood's superior growth rates. Countries such as New Zealand and Australia, that once established softwood plantations almost exclusively, now plant more hardwood than softwood. Technological advances have also, previously, enabled composite board products such as OSB to take most of the market away from plywood and are providing composite alternatives to dimension lumber in structural applications.

Developing and maintaining an innovative capacity is necessary to remain competitive, and this is most effectively undertaken by creating a culture of innovation. Little information could be found regarding BC's innovative capacity; hence the following assessment uses national statistics. Our belief is that the national statistics are sufficiently applicable to the BC forest sector to enable us to draw relevant conclusions.

Our assessment is that Canada has a culture that is moderately innovative. Many of our competitors have a greater commitment to innovation - in an assessment based on 1995 data, Porter (1999) found that Sweden's spending on R & D (for all sectors) was equivalent to 3.0% of GDP, Finland was at 2.4% and Canada spent about 1.7%, of its GDP on R & D. Finland was making a major national effort to become more innovative - between 1985 and 1995, the Finns increased R & D as a proportion of GDP from approximately 1.6% to 2.4%. Canada had a marginal increase during this period (approx 1.5 to 1.7%). A more recent series of innovation indicators was obtained from the web site <http://www.nationmaster.com/country/ca/Economy> and these are displayed in Tables 3 and 4.

**Table 3.** Competitiveness Indicator Data for Canada and Forest Products Competitor Countries

Country	Business spending on R & D as % GDP	Gov't spending on R & D as % GDP	Total spending on R & D as % GDP	R & D personnel per million people	Patents per million people	Innovation Index	Growth Competitive ness Index	Technology Index	Policy Competitive ness
Australia	0.67	0.71	1.7	3320	75	26.9	5.25	4.93	89.9
Canada	0.74	0.52	1.7	3009	31	26.5	5.23	5.05	76.83
Chile	n/a	n/a	0.6	370	n/a	19.7	5.01	4.55	66.38
Finland	2.13	0.93	n/a	n/a	187	29.1	5.95	5.92	92.36
New Zealand	0.34	0.59	1.2	2197	103	22.1	5.18	4.76	69.63
Sweden	2.58	0.93	3.8	4507	271	26.9	5.72	5.80	62.84
U.S.A.	1.76	0.77	2.5	4103	289	30.3	5.82	6.24	78.20

**Table 4.** Competitiveness Indicator Ranking for Canada and Forest Products Competitor Countries

Country	Business spending on R & D as % GDP	Gov't spending on R & D as % GDP	Total spending on R & D as % GDP	R & D personnel per million people	Patents per million people	Innovation Index	Growth Competitive ness Index	Technology Index	Policy Competitive ness
Australia	16	9	16	7	19	5	15	16	3
Canada	14	15	18	10	31	10	16	13	8
Chile	n/a	n/a	42	52	n/a	33	23	31	16
Finland	3	1	n/a	n/a	9	2	2	3	1
New Zealand	18	12	24	18	15	22	19	23	13
Sweden	1	2	2	3	4	8	4	4	20
U.S.A.	5	5	7	4	3	1	3	1	6
Number	18	18	71	91	63	68	102	101	59

Source: Data presented at web site: <http://www.nationmaster.com/country/ca/Economy> (note this is the URL for Canadian economic information). Various sources were used to compile the data at this website – data are recent (2001-03). Checked May 5, 2005.

Table 3 shows the data used to provide indicators of innovation, while Table 4 provides country rankings. Note that there is variation in the number of countries that provided sufficient data to calculate each indicator, the bottom row of Table 4 shows the number of countries being ranked under each indicator. Sweden and Finland are clearly the most innovative of the countries shown in the two tables, with the US not far behind. Canada is clustered with Australia and New Zealand, while Chile is quite distant in most measures.

Further evidence of a modest commitment to innovation was shown in Figure 1, which shows the amount of R & D spending by the Canadian, American and Scandinavian forest sectors. If any more evidence on this point is required, Table 5 provides it. Table 5 compares the total forest area, the forest area available for harvest, the annual harvest volume and the estimated value of forest products manufactured. Note the number for Finland seems very high – it was estimated by prorating the value of exports by the proportion of production by major product category that is exported, multiplied by unit export value. Also note that in Finland and Sweden most forest area is privately owned and has different terrain than British Columbia; thus, more of their forest is available forest area.

**Table 5.** Forest Area versus Production Statistics for Finland, Sweden & BC

Jurisdiction	Total Forest Area (MM ha)	Available Forest Area (MM ha)	Annual Harvest Volume (MM m <sup>3</sup> )	Value of Forest Products (Billion Cdn\$)
Finland	21.9	20.7	60	27.2
Sweden	27.3	21.2	84	20.4
BC	58.7	23.0	76.9	18.6

Innovation need not only take place in processing and manufacturing. As we will explore in this paper, innovations in management, policy, and regulation can have important positive impacts on the forest sector. More technical areas where expertise and innovation can provide advantages include tree production and genetic selection, protection from insects and disease, inventory and satellite imagery, and supply chain enhancement. Looking further down the road, there is potential to use wood and tree products for chemicals, alternative forms of energy, and other types of products that are not often considered to be forest products. Research undertaken in these areas will probably have a long timeline but may yield potentially significant results that could eventually transform the forest sector, especially if one assumes that the usage of newsprint and printing papers may decline substantially in the future (Fraser Paper Inc. 2005).

### Theme # 3 – Emergence of alternative uses of wood

The energy sector is now examining the potential use of forest fibre as a partial replacement of fossil fuels or as a means to meet increasing energy demands. They view the forest sector as having two primary sources of raw material: standing biomass and residue biomass. The standing biomass estimate is that on the 245 million hectares of timber productive forest in Canada there are 15, 835 million tonnes of carbon. The energy content of this resource amounts to 566 exajoules, or about 69 times Canada’s annual energy demand met by fossil fuels. The analysis also claims that the current annual energy content of the biomass harvest in Canada amounts to 5.1 exajoules, which is 62 percent of the energy derived from fossil fuel combustion. A 25-% increase in forestry and agricultural production in Canada could provide about 1.25 exajoules a year in biomass energy, an amount equal to about 15 % of the energy that Canada now derives from fossil fuels (Bioproducts Canada 2004).

The forest and agriculture sector also produces a large residual or residue biomass carbon streams. The authors claim that of the more than 66 million tonnes of carbon a year in the residual or waste biomass carbon stream, about 60 million tonnes may be considered “available” feedstock for a bio-based economy. This represents about 42 % of the entire forestry and agricultural harvest. The

energy content of this biomass resource, conservatively estimated to be in the range of 1.5–2.2 exajoules a year, is equivalent to 18–27 % of the energy that Canada derived from fossil fuels in 2000 (Wood and Lazell 2003).

Table 6 summarizes the non-biomass energy use currently in Canada. The opportunity costs associated with wood fibre (very low in the case of residues) could make it an attractive source of fibre for bioenergy in the future. Wood and Lazell (2003) admit that the economics of biomass energy from forest material will require further examination.

**Table 6.** Canada’s non-biomass energy use: year: 2000 estimate

Energy Source	EJ*/year
Coal	1.40
Oil	2.92
Natural gas	3.91
<i>Total fossil fuels</i>	<i>8.24</i>
Net nuclear	1.05
Net hydro	3.30
<b>Total</b>	<b>12.60</b>

Source: Canada’s Energy Outlook 1996-2000 as cited in Wood and Lazell 2003.

\* 1 Exajoule = 10<sup>18</sup> Joules per year

#### Theme # 4 – The end of low cost energy

One of the most important economic shifts in the last several years has been a huge increase in energy prices, exemplified by the quintupling in the price of oil, from US\$10/barrel in 1998 to as much as US\$60/barrel in early 2005. There is a growing conviction that this heralds a new permanently higher level of oil and gas prices, with the potential for further price increases over the foreseeable future. This situation has been brought about by strong global demand that has increased more rapidly than supply, and is poised to continue to rise faster than supply can increase. One of the reasons for the inability of supply to keep pace with demand is the impact of low hydrocarbon replacement rates, and the very slow progress in the provision of meaningful quantities of energy from non-conventional sources, such as wind, solar, hydrogen cells, and other renewable sources. On the other hand, environmental standards and concern about global warming, which has been largely brought about by the combustion of hydrocarbon fuels, limit many countries’ inclination to use coal, which is abundant. Nuclear power is quietly expanding its share of electricity production in Europe and Asia, but this technology is expensive and has major risks, environmental problems and heavy baggage.

There is widespread debate over whether the current high oil price regime is here to stay, whether prices will decline once various bottlenecks have been mitigated (e.g. more refining capacity has been constructed), or whether prices will rise further, driven by supply growth that continues to lag demand growth. Main arguments for various outlooks are summarized in the following paragraphs, but perhaps the critical point is that the current period of uncertainty (and accompanying high prices) seems to be here for some time because the uncertainty does not look as though it will dissipate soon. It is also important to point out that oil is perhaps the most politically sensitive of all commodities, which magnifies the uncertainty.

The debate over oil is most often cast in terms of whether the world is running out of oil. Technically, this is an economic question, since only 35% of the oil in any deposit in the world can be extracted using current technology and in the present pricing climate. Optimists argue that technological improvements will continue to raise the recovery rates, and point to continuous increases in the amount of global proven oil reserves. Some argue that there remains the potential to make major discoveries, since many regions have not been well explored due to political constraints, or because the technology and price environment has only recently made them attractive (e.g. deep ocean beds).

On the other hand, pessimists argue that oil production has peaked in many well-known deposits, such as the North Sea, Norway, continental US, and even some OPEC countries such as Venezuela. Peaking reflects the finite quantity of oil that is present in a deposit, and the physics of oil extraction. The originator of what is known as the theory of peak oil production, M. King Hubbert, a US geologist active with Shell during the 1950's, famously predicted that the US oil production would peak in the early 1970's. Hubbard did not foresee the finds offshore of Alaska (Prudhoe Bay) or in the Gulf of Mexico, but production from the continental US topped out in 1970. Moreover, his theory predicts that there is a relatively flat plateau associated with the peak, but production declines significantly afterwards. Pessimists also point to very low replacement rates among major oil companies in recent years (Nilsson 2005). There are also suspicions that the lifespans of major Middle Eastern oil fields have been overstated, perhaps vastly.

Yet what seems to be less contentious is that energy prices are unlikely to decrease meaningfully in the foreseeable future (i.e. within the next several decades) and are more likely to increase. Even if oil supply levels are maintained, the costs of obtaining it are bound to increase as more sophisticated technology is employed and less accessible deposits are tapped. The link to global warming, and the potential for the introduction of carbon taxes will further increase the cost to users of energy, while there may be incentives put in place to produce green energy. Finally, economic development has reached a critical mass in China and India and the growing middle class is eager to own a car and a large home. Interestingly, consumption habits in North America have proved very resistant to substantially higher oil and gasoline prices – the sales of sport utility vehicles have only recently begun to decline and there have not been any major signs that consumer behaviour has changed materially.

A scenario of continuously rising prices has major implications for all sectors of the economy, and the forest sector will be subject to major impacts given that it is a heavy user of power. Even though the sector has made substantial investments to become more efficient in its use of energy, it remains a major consumer. A rising cost of energy, added to an already high cost structure, will create further competitive disadvantages. An illustration of this is provided by Ontario where electricity prices have moved from being among the lowest in North America to the highest, having a major impact on the profitability of the forest sector.

The rising cost of energy will also shift relative prices between different products and ways of doing things. For example, higher paper production costs, if they could be passed on, may accelerate the shift to electronic delivery of news, advertising, and information. If the costs can't be passed on, the industry becomes further squeezed by higher costs and prices that are resistant to increase. However, higher energy costs will also raise shipping costs, providing some buffer against overseas competition, while also constraining access to overseas markets. Thus, higher energy costs may provide opportunities as well as constraints.

The harvesting and processing of biomass also opens up opportunities for the forest sector to become a producer of conventional and non-conventional power. Many forest products mills already produce energy by burning waste wood such as bark, cull, and other processing by-products. There is further potential to generate biomass-based fuel. Pulp mills still produce sludge that is largely organic in nature, and if it could be dried efficiently it could be burned rather than spread on farm fields or landfilled. There is also the potential to use currently unutilized parts of the harvested tree, such as branches and roots, for biomass. Recently, BC Hydro has encouraged the development of co-generation facilities and offered more attractive terms for purchasing spare power.

As discussed above, looking further into the future, there is the potential for the forest industry to become a major producer of biofuels. Growing plantations for biomass production was heavily researched in the late 1970's and 1980's, falling by the wayside as high prices induced economic recession, spurred the exploitation of alternative sources, and encouraged fuel conservation. Researchers are once again considering this possibility.

## Theme # 5 – Social and environmental requirements

Starting in the late 1980s, the forest products industry became more accountable for its environmental and social performance along the whole supply chain. Wood product certification and parallel regulatory initiatives were a stimulus for change in environmental performance; public involvement and consultation with First Nations became a key social component of operations. To incorporate changes, processes (regulatory and non-governmental) were established to define the agenda, development baseline measurement methodology (indicators) and means to monitor progress (verification) towards a target.

In Canada, starting in early 1990, the discussion was initiated with calls for Sustainable Forest Management (SFM) when the Canadian Council of Forest Ministers (CCFM, an organization formed in 1985) convened a national forum on “Sustainable Development and Forest Management.” It succeeded in convincing the forest sector to embrace sustainable development concepts if it hoped to retain a social licence – a concept blending social acceptability and environmental performance. Once accepted, the sector attempted to make progress with several key parallel provincial and nationwide initiatives (Duinker and Bull 2004). Despite the confusion of various, sometime competing, processes, there is greater clarity on what social and environmental requirements will need to be met in order to retain the social licence to operate.

Table 7 summarizes many of the key environmental and social performance indicators that are now being considered for corporate reporting in the forest products sector<sup>xvii</sup>. Variation on the theme of how to report is occurring (e.g. Global Reporting Initiative) and so it should be considered as part of the sector’s competitive strategy to develop unique reporting mechanisms.

**Table 7.** Examples of key environmental and social reporting parameters

Environment <sup>xviii</sup>	Social
<b>Wood Tracing</b>	<b>Community</b>
▪ Extent	▪ Public Reporting
▪ Compliance	▪ Public Involvement
▪ 3 <sup>rd</sup> Party Audits	▪ Indigenous Involvement
<b>Efficiency</b>	▪ Compliance with Laws/Regulations
▪ Energy Efficiency	▪ Self-Regulation
▪ Material Use Efficiency	▪ Protected Areas
▪ Pollution Abatement	▪ Education Promotion
<b>Sustainable Forest Management</b>	<b>Employees or Workplace</b>
▪ Biodiversity	▪ Equal Opportunity Employment
▪ Long term Productivity	▪ Occupational Injury Prevention
▪ Ecosystem Health	▪ Health and Safety
▪ Soil and Water Conservation	▪ Professional Education
▪ Carbon Cycle	▪ Research and Development
▪ Socio-Economic Benefits	▪ Corporate Governance
▪ Institutional support of SFM	

Source: Bull, Williams and Bull. 2004

While Table 7 is a summary list (see Annex 2 for more detail), some forest products companies are using this type of structure to create their annual social and environmental reports. For BC companies to remain competitive they will have to consider a strategy for environmental and social reporting. Some competitors are embracing the increase in reporting requirements (particularly Scandinavian and Brazilian companies), others are resisting for a host of reasons.

Strategically, BC companies will have to consider where to place themselves against their competitors, especially since BC has a host of unique challenges, which are summarized later in this report.

## **Theme # 6 – Institutional arrangements and governance**

Changes in the way individuals and organizations work together have been driven by changing technology (especially communications) and changing expectations of the public and stakeholders, as well as governments and companies. These factors are leading to changes in institutional arrangements in all sectors, including the forest sector, accompanied by changes in governance. At the same time, people and stakeholders now expect to have opportunities to be more involved in many aspects of policy-making, planning, some areas of decision-making, and monitoring.

Technology is a key enabler of different ways of working together, and it has flattened hierarchies and decision-making processes. Networking has allowed more people in distant locations to work together more intricately and this has facilitated changes in research. It is now feasible to undertake larger, more comprehensive projects using a wide range of expertise; it is possible, for example, to undertake coordinated research along the length of the value chain. This means that a larger scale of research organization is feasible, and furthermore, that size provides greater ability to leverage project funding. It should also be possible to more quickly move a concept through the various stages of research into application or market. The Scandinavians have recognized these opportunities, and have merged a number of their research institutes, including international mergers, in order to leverage these benefits. If the administrative challenges associated with these larger organizations can be mastered, this suggests that the Scandinavians, in addition to spending a higher proportion of their revenue on R & D, will also use their R & D more effectively than BC or Canada are under the present system.

While technology has enabled many changes in the institutional framework of society, there are other forces at work as well. Now that most people in the forest sector have accepted the overall principles of sustainable forest management, companies and governments have found that they can negotiate with ENGOs and other stakeholder groups rather than engage in public protests and debate. For their part, having established their ability to affect negatively the public image of a government or company, ENGOs are finding that they too can make progress at the bargaining table. Finally, some traditional adversaries are realizing that they have more in common than they formerly thought. There is yet another explanation for the greater use of public and stakeholder committees, and that is because the forest provides many benefits that are not valued in a market or other process, and many are in fact intangible. Decision-making in such a situation calls for discussion and negotiation, rather than a reliance on analysis.

Now, because all interest groups have an interest in seeing a profitable and sustainably managed forest sector, round tables and stakeholder or public citizens' committees are quite common. If the BC forest sector is to develop and successfully implement a competitiveness strategy, it will be beneficial if there is stakeholder participation in the development and oversight of the strategy. Other jurisdictions have done this – for example, the Finland's Wood Wisdom initiative draws on a partial range of stakeholder interests. In BC, with experience from the Land and Resource Management Planning tables, community forests, and Model Forests, there is extensive experience in working in broad partnerships.

A second relevant shift is the delegation of former provincial government responsibilities to companies. This has been driven by provincial government downsizing, greater interest by governments in having the sector pay what is seen as their fair share of forest management costs, and the recognition that for some things, it is preferable to unleash the efficiency imperative in the private sector. This has been most apparent in monitoring – however, there are examples from across the country where activities such as compliance inspections are undertaken by companies.

To further provide an incentive for good practices, some provinces have considered dividing the forest licensees into two tiers based on the quality of their forest management. One proposal was that companies that were usually in substantial compliance with regulations could self-evaluate on a wider variety of activities, and avoid the need to obtain regulatory approval for some standard activities. Government spot checks would be done to check on the company and if substantial deficiencies were found, the company would return to business as usual status, and be subject to the full suite of regulatory requirements. The keys to successfully implementing a scheme like this is to ensure that the company incentives line up well with the public good, and ensure that government monitoring is undertaken at an appropriate intensity.

The reader should not think that the picture being described here is too rosy. One of the drivers for greater public and stakeholder involvement is lack of trust of both companies and government. This phenomenon is not limited to the forest sector alone, by any means, but is perhaps heightened because so much of the land base is public. There are also many public goods and externalities in forestry, that add to the potential for dispute between parties.

At present, cynicism and apathy about government is running very high and the impetus to privatize remains dominant. The authors do not think that privatization of Crown land is appropriate and think that the challenge is to design a policy and regulatory framework that best takes advantage of public ownership while enabling companies to operate in a way that is as unencumbered as possible while being consistent with sustainable forest management and the public interest.

## **Theme # 7 – Changing competitive landscape**

It is a truism that the competitive landscape is always changing; however, some changes, such as exchange rates, tend to be generally cyclic whereas others represent change that is significant and irreversible.

There has been a huge amount of attention given to the emergence of China and, to a lesser extent, India as industrializing economies. This degree of attention is deserved, since these are changes of a scale that is rarely witnessed – the collapse of communism may be another. These two countries offer BC both competition and potential market opportunities.

On the consumption side, the growth of the middle class in both countries is expected to spur global demand for solid wood, board and paper products. Roberts *et al.* (2005) observed that the increased newsprint demand between 1998 and 2002 from China changed what would have been a decline in global demand to an increase. India's emerging middle class should have a similar impact on forest products demand.

Both countries, especially China, have domestic timber production and processing industries, but both countries have a shortage of domestic fibre. China presently imports approximately from 35 - 55% of its wood fibre, and this is expected to increase. There are many old and very inefficient mills within China that are expected to close, in part because they are very wasteful of energy and water, which are scarce and relatively expensive. On the other hand, China is building some very large, new and efficient mills that are being fed largely with Russian timber. These mills have costs of production that are far lower than BC's, or most other producers. In comparison, India has a relatively low wood production and much of it is used for fuelwood and charcoal. Hence, India can be expected to become a major importer of forest products.

While China and India are dominating the headlines, countries such as Brazil, Indonesia and Russia should not be overlooked – they all have relatively large populations, large forest resources (some of which have been heavily depleted), and forest sectors that are competitive and have the potential to be more competitive still. While the rate at which these three countries will develop is somewhat uncertain, their development will unleash further substantial changes to the competitive landscape.

The nature of world trade has, until recently, been liberalizing overall. Recently, this trend has stopped, with the European and US agricultural subsidies, trade friction with China, and increased protectionism blocking further movement. Tariff barriers limit the ability of Canadians to ship forest products to Europe and parts of Asia, and of course the long-running softwood lumber trade dispute with the US has had a similar effect.

To conclude, we anticipate that the global balance of timber and forest product consumption and production will change significantly over the foreseeable future, and countries (and companies) that are not tracking the pending changes and innovating to stay ahead of them will lose ground.

## 5.0 BC’s Unique Forest Sector Attributes

British Columbia's forest sector has some unique characteristics that need to be considered and incorporated into a made-in-BC approach to developing a forest sector strategy on competitiveness. Major specific characteristics include:

- Key differences between the coastal and interior regions, and the resultant forest industrial bases;

The current infrastructure of the forest products industry has been shaped by biophysical, ecological, political, cultural and economic forces. We have summarized key distinguishing characteristics for each of the three regions in Table 8.

**Table 8.** Key distinguishing characteristics of three BC forest regions

Policy, Management or Business Issue	BC Coast	Southern Interior	Northern Interior
Forest Management			
• Planning	Highly planned	Highly planned	Less planning complexity
• Felling	Hand felling	Mechanical	Mechanical
• Forwarding/ Yarding	Cable and Helilog	Ground based	Ground based
• Bucking	Cut to length	Tree length/Cut to length	Tree length/Cut to length
• Hauling	Roads/Water	Roads	Roads – permanent and temporary
• Sorting	Highly sorted	Medium sorting	Little sorting
• Post harvest treatment	Natural /Plant	Natural	Plant
Forest Species	Df, H, C & Ss	Df, Pp, C, L	Pl, Sb, Se, Sw, Poplar
Forest policy –Annual Allowable Cut	Decline	Decline	Increase followed by serious decline
Forest policy – harvest level	Serious decline	Decline	Significant increase
Manufacturing	Costly; low ROCE	Highly efficient	Highly efficient
Major Forest Companies	Western Forest Products, Interfor, Brscan	Tembec, Riverside/Tolko	Canfor, West Fraser
Forest Products Markets	US and Asia	US	US
First Nations	Smaller traditional territories	Large traditional territories	Large traditional territories

- The unique natural and ecological values of BC's forested land base, and the importance of the industries and services that rely upon them;

In both a Canadian and global context, the ecological diversity of BC's forests is highly significant. The importance of these ecosystems led to calls for change in forest practices starting with protected areas in coastal British Columbia in the early 1980s, and leading to efforts to define High Conservation Value Forest in the southern interior region and now to efforts to protect the intact natural forest of the northern interior region in a campaign focused on the boreal forests of the world.

These unique forested landscapes provide much more than timber products and the wide range of products are now increasingly recognized in forest and land use plans. The constraints on timber supply are significant and will have a direct impact on global competitiveness. For example, the new forms of planning will likely require more roads, more road maintenance, different harvesting systems, more complex planning, new approaches to management of natural disturbances and new mill locations.

On the other hand, the timber being removed from these complex landscapes should be considered a 'greener' product in the marketplace which, like organic agriculture or fair trade coffee, should yield a premium in the marketplace. In other words, the more expensive wood will have to yield a higher price if it is to sustain a reasonable market share.

Natural disturbance regimes are also a driving force of change in the BC forest landscape. The rapid increase in insect outbreaks combined with an aggressive long-standing fire suppression policy means that from a competitive point of view, forest products companies are faced with very unique challenges on how to deal with wood originating from either infected or fire damaged forests. Given the significance of the natural disturbances, it still remains uncertain how industry will respond.

- The many First Nations land claims which are unresolved, and the lack of treaties;

British Columbia is unique in the Canadian context since it currently has only one Treaty signed – the Nisga Treaty. It is often claimed that signing more treaties will create business certainty but the Canadian experience is that this may not be the case, especially in the areas where the treaties signed are old and unclear. In fact some claim these old treaties create more business uncertainty than not having any treaty at all.

Currently there are a number of bands in various stages of treaty settlement. The government of BC has been offering short term contracts to First Nations largely in the form of short term non-renewable licences to give them access to up to 10% of industrial wood supply. The terms 'consultation' and 'accommodation' are still being tested in the business relationship but as one mining industry representative stated: "Consultation is whatever they say it is."

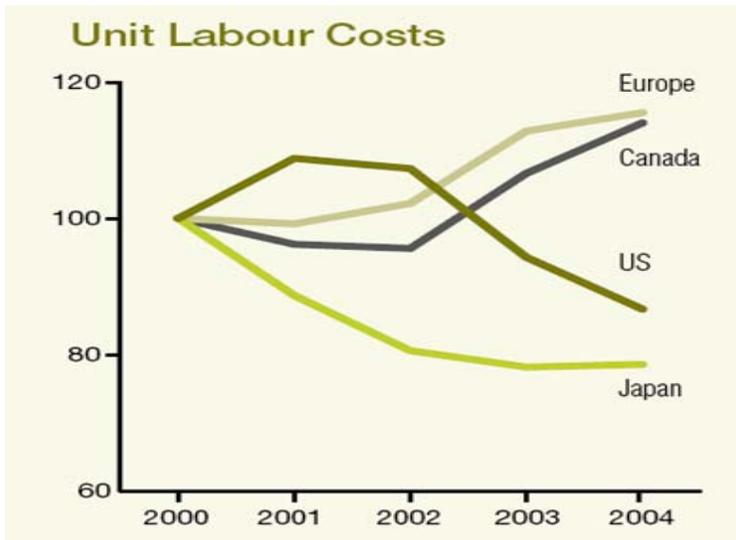
Since the process of treaty settlement could still take decades, British Columbia's forest products industry has to find its own means to consult and accommodate. The courts are weighing in on defining the nature of these relationships and business certainty will not be created until the joint venture relationships are clarified.

- A highly trained and skilled sectoral workforce;

Canada has a bleak record in labour productivity (output per hour worked) (Gomez 2005). Since 2001, the Canadian economy has registered a cumulative increase of just 2.5 per cent in productivity growth compared to a 15.9 per cent gain in the United States. The lack of labour

productivity gains, particularly in the construction sector, combined with the higher Canadian dollar, is largely responsible for last year's 8.5 per cent gain in unit labour costs in Canada (Gomez 2005).

As Figure 6 indicates unit labour costs in Canada are now on par with Europe and significantly higher than in the US or Japan. The rise in unit labour costs has an impact on competitiveness, unless, of course, there is a corresponding rise in labor productivity<sup>3</sup> which is at least driven by having the workforce better trained and more highly skilled.



**Figure 6.** Unit Labour Costs for Canada, US, Europe and Japan.  
Source: IMF World Economic Outlook as cited in Price Waterhouse Cooper 2005.

In 1999, there were 90,600 forest sector workers employed in BC. The characteristics of business establishments within this industry group are quite different. In logging, most establishments are relatively small. Paper production, with its high capital costs, tends to involve bigger establishments with large numbers of workers. Wood manufacturing is the biggest employer, with nearly half of the industry's work force employed at sawmills and other wood manufacturing establishments. Logging, reforestation, and related activities employ 26% of the workers, and a similar number of people have jobs at pulp mills or work for other types of paper manufacturers.

A third of the people who work in this industry have jobs in occupations unique to manufacturing and processing. One in five is a tradesperson, logging truck driver, or operator of other transportation equipment. One in seven works as a logger, faller, logging machinery operator or in other similar occupations. Business, finance and administrative workers make up 11% of the work force, 8% are in natural or applied science occupations, and 6% of the jobs are in management. Men make up nearly nine-tenths of the work force.

In 1999, one in every 12 workers in the logging and forest products industry was self-employed. This type of working arrangement is most common in the logging and forest services component of the industry, where about a fifth of the workers are self-employed, but is less frequently seen in wood and paper manufacturing. One reason for the difference is that the set-up costs for a logging operation are usually a lot lower than they would be in wood or paper manufacturing, so it's easier for someone to start up their own logging business. Contract

<sup>3</sup> Statistics Canada announced in April 2006 that there was an error in labour productivity calculations, therefore this graph likely does not represent the correct unit labour costs for Canada.

logging (where bigger forest companies hire contractors to do some of their logging) is a fairly common practice in British Columbia.

Most of the jobs in this industry involve full-time employment. Ninety percent of the people working in the logging and forest products industry spend at least 30 hours on the job each week. In logging, the percentage is even higher, at 95%. The longer hours of work and relatively high rates of pay in the industry translated into average weekly earnings of \$899 in 1999. This was 43% higher than the all-industry average for that year. Within the industry, earnings were highest in paper and allied products manufacturing, at \$1,073 per week. They averaged \$903 in the logging industry.

Despite the high rates of pay, job growth in the logging and forest products sector has been minimal since 1984. The total number of jobs increased by only 9% between 1984 and 1999. By 2008, the forest sector's share of total employment is expected to fall to 4.9%, down from 5.3% in 1999. During the same period, the industry's share of GDP is forecast to continue to fall, dropping from 6.1% to 5.8%. (BC Statistics. 2001)

So while the statistics indicate a fall in share of employment, the absolute numbers do not reveal the most critical issue. FPAC (2002) contends that an aging workforce and outdated industry image are creating a potential human resources shortage. The average worker in the pulp and paper industry is over 40 years of age and the proportion of workers 45 and older is projected to reach 35% by 2005. At the same time, the availability of a younger skilled workforce is diminishing, with enrolment in undergraduate forestry programs declining by 27% over the last four years. The decline in enrolment for such programs has been linked to an outdated image of the industry as a low tech, cyclical employer, environmentally irresponsible, with mills that are viewed as unappealing workplaces (FPAC 2002).

FPAC (2002) also suggests provision for increased support for skills and human resource development. More specifically they called for:

- Establishing a Forest Products Sector Council.
- Supporting apprenticeship programs.
- Supporting greater post-secondary enrolment in industry related programs.
- Number of timber dependent communities

In addition, communities that have strong cultural and educational opportunities promote good workforces. It would appear that a beneficial element of corporate strategy would be to ensure support for factors that improve the quality of life in communities.

British Columbia is in a unique position of having over 250 timber dependent communities. The nature of natural resource dependent communities (those which extract or remove/renew) is rooted in their dependencies on extraction or removal, which frequently define the community and are responsible for its very existence. Other industries, services and government facilities are only there because of the existence of the industry. In making British Columbia more competitive, some of the traditional dependent communities will not likely survive and others will grow as the industry adjusts the economies of scale in their production processes.

Given the uniqueness of the BC Forest products sector, we should keep the following issues in mind in developing a strategy for competitiveness:

BC is very well positioned to compete as a green producer of certified forest products, having protected a large proportion of its forest area. The BC government should continue to support industry's efforts to gain certification.

BC produces a wider range of species than many other northern or plantation based jurisdictions, and these all have different fibre, processing and appearance characteristics.

Timber from the forest, as opposed to plantations, is also larger than plantation timber. These are characteristics that can be taken advantage of – so that perhaps pulp should not be a primary end product from large timber, whereas it has a potential advantage in interior or exterior uses where appearance is an important factor. Similarly, there is considerable room to tailor the use of different species to applications that are best suited to important characteristics.

BC's forest produces many valuable non-timber products and services. Finding a mechanism that would encourage forest companies to increase the quality or supply of these, while compensating the companies for doing so, would provide a socially beneficial outcome.

BC has a well-trained and highly educated workforce that is complementary to innovation, increasing productivity, and adding value.

BC is an open, stable and democratic society, with negligible corruption, healthy finances, and relatively strong intellectual, financial and physical property rights. This promotes security of investments and returns.

BC needs to continue to go through a rationalization process whereby many of the smaller older mills are closed. BC industry needs to be able to generate a higher rate of return in order to attract capital for investment in new facilities.

As shown in Table 1, BC companies are relatively small within the global sector. There is a need for them to continue to expand or risk being taken over. Furthermore, the looming reductions in harvest due to the pine bark beetle suggest that expansion outside of the province is necessary. Opportunities for major mergers or acquisitions between BC companies are limited, and the BC forest sector is advised to look abroad for acquisitions. The appreciation of the Canadian dollar versus the US dollar makes US assets more attractive now, and purchasing those would help neutralize the impact of the softwood lumber trade dispute. The US market is also better understood and more compatible with the Canadian market than other overseas markets.

The BC forest sector, despite recent reforms, remains over-regulated, especially in the sense that many of the regulations in place are time-consuming and costly for government enforce and industry to comply.

## **6.0 Global Market Intelligence**

### **6.1 Why is market intelligence important?**

In Nordic Europe market intelligence in the forestry and forest-based sector has been identified as one of the essential areas for action; the other three being research and development, promotion of forestry, and wood related employment and communication (Nordic Family Forestry 2005). Since Canada, and more specifically British Columbia, is a leading export nation of forest products, it behooves us to understand our markets and our competitors.

### **6.2 Where is the current market intelligence?**

Statistics on forests and forest products are scattered through various institutions. This is a very serious problem since the statistics frequently are:

- not linked to global, regional or country level coverage;
- inconsistent from jurisdiction to jurisdiction;
- frequently not verifiable; and
- in conflict with each other, particularly when they reside in different institutions

Table 9 summarizes some of the key institutions which house relevant datasets on forest and forest products. The list of institutions is not meant to be exhaustive, it is merely meant to indicate the complexity of the institutional arrangement.

**Table 9.** Summary of institutions

Organization Type	Forests Institutions	Forest Products Institutions
Governments	FAO, ECE, ITTO or Projects (SIDA, DFID, CIDA), Government Research Agencies	FAO, ITTO, Statistical agencies – e.g. Stats Canada, BC Statistics, Gov't Research Agencies – e.g. USDA Forest Products Lab,
NGOs	NGOs – Global Forest Watch, Greenpeace, WWF, WRI, Conservation International, NatureServe, Nature Conservancy	Certification – SFI, FSC in particular
Industry	Reliance on select few in the consulting industry RISI, JP, Wood Resources International	Industry associations, consulting industry
Research	IIASA, CIFOR, CATIE	FORINTEK

It is important to consider the institutions since the ad hoc arrangement does pose a serious challenge to the gathering of global market intelligence. While this may serve as an important component of a competitive strategy for some individuals, firms and countries, it does not help British Columbia develop a coherent picture of an industry that is so vital to their economy.

### 6.3 Market intelligence – A case study of China

To better understand the role of market intelligence we selected China as a case study. Below are some key features of the Chinese forest and forest products industry, and some key findings of recent studies.

#### Structural markets

- Market opportunities in urban China are limited. In the structural wood market building codes greatly limit the use of wood (including wood trusses), except for buildings of 1-3 stories which are primarily non-residential. In the non-structural wood we are not competitive with Chinese producers in term of costs.
- China structural lumber markets grew by 100% per year between 2002-2004. The expectation is the same for 2005. For this market 75% is imported, approximately 30% is US Southern Pine and 55% is from Europe, primarily Finnforest.
- Market opportunities in rural China are simply unknown. There is low income per person, a tradition of wood framed houses and a huge pent-up demand. The central government would have to allocate large sums of monies to the rural areas for house construction and also develop design standards to incorporate North American materials.
- There are several key building codes that have now been approved which are consistent with Canada's building standards.
- Housing costs in China are very high relative to the wages. Despite this housing starts are continuing to increase at a significant rate regardless of vacancies in existing units.
- Domestic wood supply is a serious constraint in rural areas in particular. (Ding 2004; Brady 2005)

### Pulp and Paper

- Fibre prices are among the highest in the world due to their deficit. In SE China, 4th quarter \$135 US per dry metric Tonne, where as Canada west is about \$75 US per dry metric Tonne; Canada east is the same level as China.
- The pulp sector sales continue to rise and the future impact of the plantation countries increasing wood supply remains unknown.
- Non wood fibre is 35% of paper and packaging furnish and recovered fibre is 45%.
- Non-wood pulp production is in serious decline and it is not clear if the existing or planned plantations can offset this reduction in supply and/or meet the increase in demand forecasted
- Canada has an established share of the pulp market but this could be threatened by development of pulping capacity in China.  
(He 2004)

### Non-structural markets

- Preliminary analysis suggests that China is a competitive threat in non structural materials, but with the right set of conditions they represent a market opportunity for the structural materials industry.

### Policy and Markets

- ROCE are higher in Asia at 6.7%; BC is 5.2% for the entire forest products industry
- Virtually no industrial associations in China.
- The old Chinese forest industry is uncompetitive and fragmented (high costs, high pollution, inefficient) contrasted to the new industry which is the most efficient in the world.
- Water and energy are a constraint for alternate materials.
- Many small unregulated and unknown manufacturers –disorganized but easy entry
- Research organizations are not producing the information needed for innovation.
- Governments at different levels not working together effectively.
- Banking is highly corrupt and needs reform.
- Poor statistical data for policy development and implementation.
- Very entrepreneurial culture with emerging middle class.
- WTO rules have forced the adaptation to developed country norms.  
(Roberts *et al.* 2005)

### Furniture

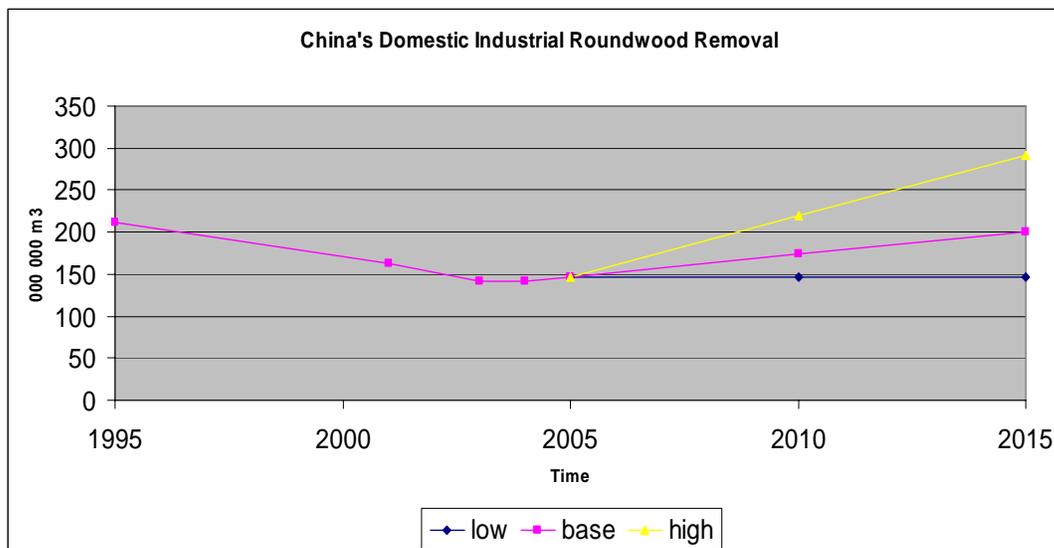
- The total number of furniture firms is above 50,000, which generally are small and medium firms. The number of employees in the furniture industry is presently 5 million.
- It may be reasonable to estimate that its total turnover will reach US\$40 billion in 2010 to 2015, of which US\$30 billion will be sold in the domestic market and US\$10 billion will be exported overseas.
- Given that the cost of material accounts for 30% of total production cost, the demand for material is valued at 110 billion RMB, of which the share of wood material is 80%, that is, the demand of the wood materials is valued at 90 billion RMB.
- In terms of volume, it is estimated that total consumption of lumber will be 240 million m<sup>3</sup> and consumption of furniture will be 44 million m<sup>3</sup> (in 1999, it was 24 million m<sup>3</sup> for furniture).
- In 1999, the actual supply of wood was 144 million m<sup>3</sup>, in which the used solid wood for furniture was 24 million m<sup>3</sup>; from that the Chinese furniture industry had made 660 million pieces of furniture. In 2010, the estimated consumption for solid wood will reach 240 million m<sup>3</sup> in which the used solid wood for furniture would be 44 billion m<sup>3</sup> which is 18.3% of the total consumption.
- In recent years, the need for solid wood has been about 150 million m<sup>3</sup> in China, and the gap between the supplies and demand is 80 million m<sup>3</sup>. In 2002, the import of solid wood was 24.33 million m<sup>3</sup> the value of which was 2.138 billion USD. In 2010,

this gap will be enlarged to 120 to 160 million m<sup>3</sup> which must be filled by importing solid wood.

(Xu Meiqi 2005)

In addition to the kind of information summarized above, there are broader sets of analysis which describe the rapid changes in the Chinese forest products markets. Following is a broader description of the potential impact on China's domestic industrial wood supply and three scenarios for forest product imports.

Figure 7 shows three scenarios for domestic wood supply in China; even in the best case scenario, the potential supply is clearly not sufficient for domestic needs. More importantly, it ignores very critical factors that directly impact wood supply in a negative direction.



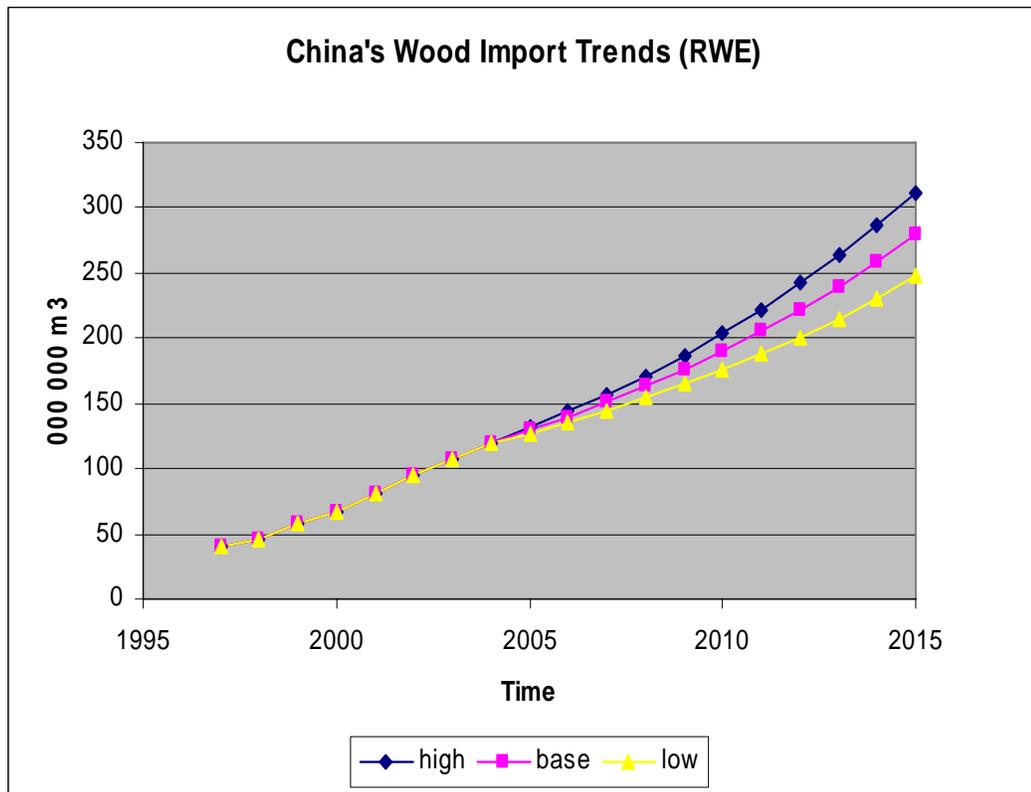
**Figure 7.** China's domestic industrial roundwood removals.  
Source: Bull and Nilsson 2004

The factors that should be incorporated into the analysis are as follows:

- **Illegal logging and overharvesting.**  
China has a history of overharvesting and in 2003 illegal logging was estimated to be 116 million m<sup>3</sup>. The official forecast for natural forest harvesting is 195 million m<sup>3</sup> by 2015 but this forecast does not account for the age class of forests already removed. Currently, most of China's forest is in a very immature stage and therefore will not be ready by 2015 as indicated.
- **Plantation underperformance.**  
China's industrial plantations are not delivering the anticipated wood production. Official forecasts suggest plantations (fast growing) will produce 133 million m<sup>3</sup> by 2015. However separate studies have shown that this forecast appears unrealistic since there are currently only about 6 million ha of fast growing high yielding plantations, not the 54 million ha officially reported (Bull and Nilsson 2004).
- **Increasing competition for forest fibre.**  
China fuelwood use is increasing especially in rural areas and fuelwood is the dominant source of household energy in almost every province in the country. (Sources: Zhou 2001, Bull and Nilsson 2004)

Figure 8 demonstrates the impact of GDP growth on import trends driven exclusively by the dramatic increase in growth of the economy. If the government was to be successful in stopping

illegal harvesting then the imports forecast would be even more dramatic. The trend projected here is consistent with the general trends we discussed of a domestic wood supply shortfall. Further, it is a significant trend since the import could well be 6 times more than British Columbia's total annual cut.



**Figure 8.** China's domestic wood supply forecast.  
Sources: Sun 2004; Bull and Nilsson 2004; Bull and Northway 2005

The point here is to illustrate that market intelligence has a value in developing an approach to competitiveness. Using China as a brief case study we can legitimately ask the question: how might it apply to future considerations for investment in British Columbia and/or investment by British Columbia based firms? Different jurisdictions are responding differently to the global market forces. British Columbia's competitive position will largely be determined by how we conduct better analyses than our competitors.

## 7.0 A Framework for BC Forest Sector Competitiveness Research

It is the view of the authors that the BC forest sector has not kept up with many of its competitors or its customers. For the past two decades or so, the sector has been pre-occupied with the softwood trade dispute, negotiations regarding protected areas and ecological regulations, and its own rationalization, especially on the coast where the sector is in transition to reliance on second growth timber. In the meantime, the sector has been quite inwardly focused and has not developed an effective response to its global competitors. It has also not been able to develop and maintain market share, particularly in Asia, where the main opportunities for sales expansion lie.

As a result, it is timely that the BC Forum has decided to embark on the development of a competitiveness strategy. Furthermore, with the industry in the interior about to go into transition once beetle wood salvage winds down, there is an obvious need to develop a strategic response.

In setting out the framework for a competitiveness strategy for the BC forest sector, we think it is important to identify some key principles that such a strategy should entail. A comprehensive competitiveness strategy:

- will necessarily involve all of the major players in the forest sector, including industry, the provincial and federal governments, NGO's, communities, other forest-related sector representatives, and First Nations. The success of the strategy hinges on strategic collaboration. The issues of greatest relevance to some of these stakeholders are discussed in more detail in other working papers that are part of this series
- will require the stakeholders to engage in a process of prioritizing the research areas
- needs to be based on sustainable forest management, with ecological, economic and social perspectives
- will necessarily involve a greater commitment to innovation, and with that comes change. While the authors see part of the strategy needing to consider measures to help reduce the human cost associated with the change that will be required, the authors acknowledge that some dislocation and disruption will ensue. The net benefit is expected to be positive to BC, although there will be costs borne by some people and communities
- should build on the strengths and characteristics of BC and its forest sector
- must be based on having a strong BC forest sector, and the authors hope that several BC companies will emerge that are larger in scope and scale than they are now. This will likely involve acquisitions outside the province, and probably outside the country, since in each of BC's sub-regions two large companies dominate. The authors believe that having several large BC-headquartered companies is important because it provides a strong likelihood of greater concern for the province's welfare than is the case if the major companies are based elsewhere (as is the case in Ontario, for example). The authors also think that the sector should contain medium and small sized companies, as well as large ones.

The authors also argue that a competitiveness strategy must put increased emphasis on the value of the product, rather than the volume of the product. This implies a move away from commodity based production and towards a focus on identifying and meeting customer needs. The research questions identified under innovation and market intelligence can investigate how to undertake this shift. We note that there is also a looming economic wood supply problem in BC, and so there is a need to also pay attention to increasing the available volume of timber. The harvest is projected to decline in all regions of BC, due to the falldown effect on the coast and insect epidemics in the two interior regions. It is like pushing a log uphill to institute a strategy to improve sector

competitiveness when wood supply is declining. Increased log imports are suggested as one way of easing this constraint, noting that Finland imports more than 20% of the wood used by its industry.

The sector is constantly engaged in cost reduction and quality improvement. Most of the efforts in these regards are incremental in nature. All companies do this as a matter of course, and all of BC's competitors are doing this. This strategy assumes that this activity will continue, but by itself it is insufficient to provide any great improvement in competitive position. Similarly, efforts to manage exchange rate fluctuations are also assumed to be part of the normal daily operations of companies, although strategic options such as the purchase of US or overseas assets can play a role in moderating risks associated with currency valuation fluctuation.

The authors feel that a successful strategy should address the key themes that have been identified above as affecting the entire sector. There will be some parts of the strategy that involve longer term research and development (longer than 10 years), such as the investigation of the potential for biochemical production. Other parts of the strategy can be executed over a much shorter time frame.

The table below (Table 10) sets out the seven forces that are driving change in the forest sector, as identified earlier in this paper, the impacts that these forces have had on the BC forest sector to date, and potential strategic responses on the part of the BC sector. The authors note that there are linkages between some of the driving forces, and the strategic responses to them. For example, research into potential measures for reducing power and fuel use would be related to research to improve the efficiency of processes and the efficiency of co-generation, as well as longer term potential for forest biofuels.

**Table 10.** Driving Forces of Change, Impacts in BC, and Potential Strategic Responses

<b>Driving Force</b>	<b>BC Impacts</b>	<b>General Strategic Response</b>
Industry Consolidation	<ul style="list-style-type: none"> <li>• Companies within BC have consolidated but the largest are relatively small by international standards.</li> <li>• Some older mills remain and are likely to be closed.</li> <li>• BC govt has removed the appurtenancy clause from timber licences</li> <li>• Declining wood supply will drive further consolidation, especially in Interior</li> <li>• Companies have outsourced some activities on the supply chain which were not profitable (e.g. coastal operations have gone to owner operators, as well as to groups such as First Nations and communities)</li> </ul>	<ul style="list-style-type: none"> <li>• Companies to develop strategy for expansion into other parts of Canada, US, or elsewhere</li> <li>• Companies are currently specializing in certain parts of the market – pulp and other commodities do not seem to offer a long-term foundation for companies</li> <li>• Government to facilitate community assistance to soften blow of mill closures</li> </ul>
Accelerating Technological Change	<ul style="list-style-type: none"> <li>• Interior sawmills are large, low cost and advanced</li> <li>• Low ROCE and lack of access to additional wood supply have limited technological investment in secondary manufacturing</li> <li>• Innovation modestly funded, unfocussed and proprietary</li> </ul>	<ul style="list-style-type: none"> <li>• Level and strategic focus of innovation in the sector need to be increased</li> <li>• Opportunities to rationalize the entire supply chain</li> <li>• Government should enable regulatory reforms to facilitate use of technology to improve quality, lower costs</li> </ul>
Emergence of alternate uses of wood	<ul style="list-style-type: none"> <li>• Research projects into biofuel production are taking place at UBC</li> <li>• Potential competition for wood for energy or competition for energy currently used in the forest sector</li> </ul>	<ul style="list-style-type: none"> <li>• Longer term area of strategic R &amp; D focus</li> </ul>
End of low-cost energy	<ul style="list-style-type: none"> <li>• BC Hydro has emphasized conservation and continued reliance on hydro</li> <li>• Power prices generally low in BC but expansion is limited</li> <li>• BC energy cost has to be viewed in a North American context</li> <li>• Large industrial emitters will be liable for polluting emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Power intensive processing will become more expensive, some products may require too much power to be worthwhile manufacturing.</li> <li>• Industry needs to consider further investments to improve energy efficiency, create heat or energy from “waste” wood.</li> <li>• Support research under point #3</li> </ul>
Societal and environmental requirements	<ul style="list-style-type: none"> <li>• BC govt, industry, and ENGOs have been effective in placing BC forest management on a green footing.</li> <li>• Most companies are pursuing certification</li> <li>• Public image of forestry still poor but improving in some areas</li> <li>• Treaty negotiations inching forward</li> <li>• Urban-rural values divide is increasing</li> </ul>	<ul style="list-style-type: none"> <li>• Keep on developing processes and decision support tools</li> <li>• Ecological sustainability is a competitive advantage that should be exploited</li> <li>• Need to continue to work to get good news story out by using third parties – industry and government campaigns are of limited effectiveness</li> <li>• First Nations to enter into more business arrangements with</li> </ul>

Driving Force	BC Impacts	General Strategic Response
	<ul style="list-style-type: none"> <li>Support for workers and communities affected by mill closures of limited effectiveness</li> </ul>	<p>the traditional forest products sector.</p>
Institutional arrangements and governance	<ul style="list-style-type: none"> <li>There are some efforts to develop a strategic direction and implement actions</li> <li>Governance has been improved recently</li> <li>CFS isolated in BC, Provincial gov't and industry partnership moderately effective, universities and research labs better connected with industry, contacts with Provincial gov't based on individuals</li> </ul>	<ul style="list-style-type: none"> <li>Some direction follows from points raised to left; partnerships need to be improved.</li> </ul>
Emergence of new competitors	<ul style="list-style-type: none"> <li>BC is experiencing strong competition from a number of relatively new sources, both directly and indirectly as Asia-Pacific trade flows are shifting.</li> <li>BC cannot continue to compete based on commodities – BC is a high cost production area and the margin on commodities is minimal</li> <li>Advanced competitors (e.g. Scandinavia) have implemented sectoral strategies that BC has not</li> </ul>	<ul style="list-style-type: none"> <li>Get access to better global market intelligence which arise from various sources and are available to the key stakeholders (industry, NGOs and governments). Each stakeholder can then add value to this intelligence in a way that it sees fit</li> <li>On-going cost reductions and quality increases are part of life but industry must consider more appropriate strategic focus – commodity production is not a long term winning strategy; some commodities will likely be part of overall product portfolio but they should not be central to it</li> <li>Make better use of BC species conditions, wood qualities in products</li> <li>More emphasis on the development of supply chain management tools and processes to link customers to raw materials</li> <li>Financing of new competitors is increasingly sophisticated. Subsidies, incentives, and trade and non-trade barriers are increasingly complex and needs a thorough analysis</li> <li>Increase innovation/ R &amp; D (as under #2)</li> </ul>

The strategic responses from Table 10 seem to fall under a number of broad themes. They are:

- Innovation - increased effort and strategic focus
- Market intelligence - competitors and customers
- Industry structure - rationalization of the industry, production facilities, and optimization along the value chain
- Wood supply - stabilize and then increase
- Sustainable forest management - Build on the BC forest sector efforts
- Continuous improvement – efficiency and fairness in regulating

Each of these themes is explored further in order to identify the research questions that would have to be addressed.

## 7.1 Innovation - increased effort and strategic focus

As indicated in Tables 3 and 4, Canada invests a substantial amount in innovation and R & D, but the level of investment is well below that of many key competing countries, such as the Scandinavian countries, the US, Japan, and others. BC is no different in this regard from Canada as a whole, and Canada and BC need to both increase the amount of investment in innovation and be more strategic and cooperative in terms of how it is directed. As the Scandinavian case studies showed, not only do Sweden and Finland spend a larger proportion of their resource on R & D; they are also leveraging their innovation infrastructure and researchers to an extent that has not yet been seen in Canada, or BC. This is not to suggest that we should copy the approaches that other countries are adopting, but rather to note that the sector is actually falling behind because it is failing to match our key competitors' efforts, *let alone* exceed them.

There are a number of initiatives under way in Canada to develop a more strategic approach to R & D in the sector, and BC should continue to be an active participant. However, their success hinges on a degree of cooperation that has not been seen before among the industry, the federal and provincial governments, universities, communities, First Nations, ENGOs, and others. BC has the wherewithal to develop a complementary provincial strategy that could reinforce the national efforts.

We note that in Sweden and Finland, the forest sector is recognized as a valued and important sector of the economy, and is supported by government as such. In BC, it seems that the prevailing view of the forest sector is that it is a sunset industry. However, as a recent BC Statistics (2004) report observed "Although much has been said about the importance of high technology to the economic future of British Columbia, natural resources, especially forest products, are still the source of most of the province's commodity exports. In fact, of the top 10 British Columbia international shipments of manufactured commodities, eight are forest products, representing approximately half of total manufactured exports. Of these, only two are considered to be in the category of secondary manufactured goods." This general situation can be seen in the Table 11.

**Table 11.** Top manufactured domestic exports from BC, 2002

Commodity	Value (million \$)
Softwood lumber	6342.9
Chemical wood pulp	2236.7
All high technology commodities	684.6
Newsprint	678.2

Source: Statistics Canada and BC Stats

As mentioned above, a comprehensive competitiveness strategy should target opportunities that will earn a favourable rate of return in the next month, six months, or year. There is also a need to consider the potential of research that may take longer to reach fruition.

The areas for research in this part of BC competitiveness strategy include:

- What is the level and character (e.g. basic or applied?) of R & D spending in the Canadian forest sector, how is the money being spent and how does this compare to our competitors? Can we simply rely on being importers (purchasers) of R&D?
- What is the return on investment of R & D spending in Canada's forest sector and what are its spin-off effects?
- Where are expenditures being made and how much of this is related to incremental improvement versus R & D with potential for major long-term benefits?
- How much R & D is being conducted in evaluating characteristics of individual BC species and wood types (e.g. old growth versus second growth) and matching these to product characteristics and consumer needs?
- How can regulations and tax policies be designed to accommodate increasing use of technology so that planning, operations and monitoring are streamlined, more flexible, and improved in quality?
- In what areas is there potential to make significant productivity gains in meeting regulations through greater use of technology?

It is anticipated that the BC Forum will serve as a mechanism that will bring about a more focused, cooperative, and strategic approach to innovation and to increasing the sector's competitiveness.

## **7.2 Market intelligence – competitors and customers**

The authors have argued that the Canadian forest sector as a whole, including BC, needs to improve its collection, synthesis and use of market intelligence. BC in particular faces dramatic changes in the structure of its competition and its markets due to the emergence of China, India and Russia, as well as the continued expansion of plantations in Latin America, New Zealand and Australia. There are many currents and cross-currents in China, and these are difficult to decipher and understand. Similarly, Russia is in a state of rapid transition as well. Our sense is that BC companies are not as active in obtaining insight and monitoring conditions in those countries especially. For example, we are aware that International Paper is now sending a staff person to work for a period of time in the Chinese State Forest Administration, providing assistance but, in the course of this, obtaining information. We believe that forest companies and sectors will have a distinct competitive advantage if they have a better understanding of the direction that governments, customers and producers are moving in Asia and Russia.

The need for market intelligence also extends to developed countries. There are opportunities for increased production of value-added products if emerging customer needs are recognized and met. To do this requires close contact with customers, awareness of what local competitors are doing, and the ability to synthesize and move this information to appropriate decision-makers. Again, we feel that there are many opportunities to improve in this respect.

One potential benefit of market intelligence would be to develop approaches that better capitalize on the work that the sector has done over the last 20 years to improve its environmental performance, which is culminating in the certification of many of the forests being managed by companies and the relatively high percentage of the landbase that is protected. The authors feel that BC has one of the most ecologically sound forest sectors, and one of its strengths is the high proportion of public ownership. However, the authors also feel that the province does not get the credit it deserves, and while there is room for improvement, there is also a very good message that is not getting out. The government and industry have spent a great deal of money and effort on getting to the present situation, and to the point where BC timber can justifiably be considered to be an ecologically value-added product. We feel that greater information on actual and potential customers' perceptions would facilitate the sector's ability to capitalize on this advantage.

Finally, there is a greater need for an understanding of markets for emerging products and values, such as carbon. The valuation and trading of carbon credits have fallen far short of expectations, for a variety of reasons. However, global warming is a scientific certainty and carbon emissions and sequestration will only become of greater importance. There is the potential for the BC forest sector to capitalize on the productivity of BC forests – but again a thorough understanding of the issue is required, and in our estimation, this is not widely understood by the sector.

While few will disagree on the value of having more and better market intelligence, how to obtain it is less clear. There appears to be a role for an industry organization, university, or other such group obtaining and synthesizing market intelligence at a fairly general level. Some of the work involved could be synthesizing available information from sources such as FAO, World Bank, CIFOR, Forest Trends, and other regional or global organizations. Basic market research is something that an industry association may also persuade its members to support. However, at a later stage, individual companies will wish to pursue angles of specific relevance, and here it is up to the companies to organize this. We note that there is the potential to develop enhanced capacity in BC to conduct this work, which will facilitate the gathering and analysis of both general and more specific information.

These observations give rise to the following research questions:

- What mechanism is best way to obtain and consolidate market intelligence? Is there a role for a BC agency or mechanism that will gather information of wide value, with individual companies following up with more specific information gathering as their specific needs dictate?
- What subsidies/incentives schemes are our competitors using to support the industry along the whole supply chain?
- What is the global current and projected manufacturing capacity in the structural wood sector / pulp and paper industry? Who are our customers that are becoming more self-sufficient in forest products and could become a new competitor (i.e. is China an opportunity or a threat)?
- What product transport scenarios are best for the BC industry?
- What portfolios of products perform optimally in various “future scenarios”?
- How have customer wants changed in the last 5 – 10 years and what parts of their wants are not being adequately fulfilled?
- What species characteristics and log type characteristics best match certain customer specifications?
- How can BC industry shift from a focus on product specifications to customer requirements?
- What would the benefits be of separating spruce, pine and fir lumber?
- What products are specifically suited to the size and characteristics of first growth coastal timber?
- What species are underutilized relative to their AAC, and what efforts can remove or mitigate some of the obstacles to greater use?
- Can utilization in general be improved?
- What is the cost of energy in competing countries and how will different energy futures scenarios affect the competitive balance in this respect?
- What are the economic impact and trade-offs between alternative uses of fibre – traditional forest products, bioenergy, carbon, etc.
- What drives investment in the forest products industry and where could BC companies focus their efforts – domestic and abroad?
- What is the current status and trends in carbon emissions and sequestration credits trading?
- What are the expected contents of the Kyoto requirements for the second commitment period?

### **7.3 Industry structure - rationalization of the industry and production facilities, and optimization along the value chain**

As we have argued above, many of BC's mills, especially in the coastal region, are small, old, poorly designed with respect to the characteristics of the resource, and uncompetitive. There is pressure to close many of these money-losing facilities, and a forest sector competitiveness strategy must enable closures to take place where they are warranted. This is not to say that efforts should not be made to find alternate uses for these mills, but there is little likelihood of attracting investment in a mill that may never earn an attractive ROCE and where timber supply is more than likely declining. We also argue that the development of an improved approach for assisting affected communities and individuals to adjust to mill closures should be part of the competitiveness strategy. This approach should include preventive actions like trying to stimulate economic diversification in communities (to which a great deal of effort has already been devoted).

In addition to eliminating high-cost production, the BC forest sector should also consider what products are likely to be viable to produce in the future. It is questionable whether the use of newsprint and other paper grades will continue to rise much further, suggesting that the production of these commodity grade forest products will complicate work planning.

In other sectors, and in other countries' forest products sectors, companies have had to be ruthless in identifying where cost savings can be obtained by contracting work out, off shoring it, or selling the line of business. For example, it is our impression that many forest companies have kept a large part of the supply chain in-house, and have not taken advantage of opportunities to lower their costs of running their businesses. There have recently been moves made in the coast to contract logging to owner-operators and to First Nations organizations as part of efforts to lower costs. Owner-operators already harvest most of the timber in the interior.

One exception to this has been the trend for companies to sell their private timberlands, and in theory it is possible to extend this way of thinking so that companies do not need to have licences to be able to run mills. Outsourcing and divestiture is viable when there is competition within the sector, but this condition is not met within the log markets of BC, since they are dominated by a few large companies.

Forests are most often viewed as a cost centre, but they could be allowed to operate as profit centres. This might encourage some log producers to better match the characteristics of the species and/or log with the expected end use. This would also make it reasonable to sell or spin off forest assets – companies need to weigh strategic implications of losing control of wood supply (and potential values due to alternate uses of wood) versus potential cost savings. The authors feel that the sector as a whole would benefit if it were more internally competitive than it is presently.

It may also be the case that forest companies look to opportunities to provide additional products, such as energy from burning or otherwise treating wood waste.

Another side of this coin is the impetus to improve product quality – this can also be a benefit of supply chain optimization.

The areas for research in this part of BC competitiveness strategy include:

- Is bigger always better in terms of economic performance and how does this differ across the various segments of the forest products industry?
- What does the standard supply chain look like in the BC forest sector?
- What is the potential for growth in outsourcing?
- How does supply chain rationalization fit with the current trend of selling woodlands? What is the optimal mixture of ownership/ licensing/ purchase or exchange?
- How do alternate land management models compare to the current approaches, and under what conditions might they be superior?

- What are the benefits and costs associated with the defined forest management area approach?
- How can forest planning regulations be modified to facilitate optimization in the upstream part of the supply chain?
- What are the transaction costs and potential benefits of more complex sorting operations?
- Can the BC government improve the ease of importing wood, chips or partially finished products into BC?
- Under what conditions is worker training effective, and how can it be made more effective?
- How can communities be given assistance to diversify their economies?
- What creative uses are there for smaller, old mills?
- What general strategic product options could be most effective under alternate global forest product demand and supply scenarios?
- How can BC design a formal continuous improvement system for forest certification?

There are also a number of questions relevant to energy use and production that could be applied to the value chain:

- What alternate uses of wood are feasible (e.g. energy, chemicals or pharmaceuticals), from what parts of the tree and with what processes?
- What technologies are available for improving the efficiency of wood use for heating or fuel in co-generation facilities? What opportunities for increased use of wood for fuel/ heating become feasible as energy prices rise?

Finally, British Columbia has a number of relatively strong business software and manufacturing technology sub-sectors that provide services to the forest industry, such as Porter Engineering, MPM, Perceptron, Halco, and Forest Ecosystems Solutions, for example.

- What sector strategies will encourage the development and success of supporting businesses?

## 7.4 Wood supply - stabilize and then increase

As we have discussed above, the authors contend that BC is moving towards a wood supply problem, precipitated in part by the mountain pine beetle. Figure 9 illustrates the mortality caused by the pine beetle in one area.

The coastal forest industry faces different challenges. Pearse (2001) projected that the annual wood supply in the region would decline from almost 30 million m<sup>3</sup>/year in 1980 to its 2001 level of 21 million m<sup>3</sup> to approximately 16.5 million m<sup>3</sup>/year in 2040. We think that the sector has to review its options in order to counteract this expected decline.

The standard options include:

- Improve utilization
- Intensify silviculture
- Access new areas

To these, we would add the following:

- Increase log imports
- Validate the second growth yield curves
- Consider additional tree improvement work in the longer-term
- Consider the economics of forest fertilization



**Figure 9.** Mortality caused by the Mountain Pine Beetle near Mount Swanell.  
Source: BC Ministry of Forests <http://www.for.gov.bc.ca/hre/bcmpb/MPBFlight/Slide7.jpg>

There would appear to be some potential to further improve utilization, including better utilization of some species and utilization of a greater proportion of the harvested tree. These are areas where considerable research has been and continues to be done – the stumpage and wood measurement systems could also be reviewed for potential opportunities to enhance utilization.

Silvicultural intensification tends to raise many people’s concerns, and with justification. Current approaches to intensive management reduce biological diversity and aesthetic appeal. Thus, there may be limited support for widespread management intensification on Crown land. However, it is possible that an agreement could be brokered that would provide the industry with limited opportunities to intensify forest management on public land in exchange for a package including less intensive management elsewhere and increased protected areas. Such an agreement has been struck in Ontario, although implementation of the more intensive management has not begun in any substantive way. The sector may also consider options for facilitating management intensification on private land, although this will also prove controversial.

Perhaps the biggest opportunity, in large part because it is least contentious, would be to increase the volume of logs imported into BC. BC companies can import timber from the rest of Canada, the US, and more probably, log exporting countries such as New Zealand, Chile, and perhaps Russia. Tropical timbers could also be imported – this would enable BC companies to provide a greater range of products and add value (we noted that the Finnish sector has greatly expanded its importation of logs in recent years).

Lastly, we note that there is uncertainty regarding yields from second-growth forests in BC, and that tree improvement and fertilization offers a longer-term potential to increase supply.

#### Research Questions:

- Consider /create conditions conducive to more intensive management of native species to provide positive impetus to timber supply

- Examine the economics of plantations, and consider the potential to allow more intensive forest management on parts of the Crown landbase in return for less intensive management elsewhere (the trade-off made in Ontario in the Living Legacy agreement)
- Can BC import wood (e.g. radiata from New Zealand) and profitably produce products?
- What are the current obstacles to increased imports of logs?
- What are the yields from second-growth forests and do we need to revise yield curves in the face of factors such as climate change?
- Where can tree improvement and fertilization be expected to yield the most cost-effective gains?

## **7.5 SFM - Build on the BC forest sector efforts**

We have described above the authors' view that BC's environmental sustainability is a major strategic advantage that is not being fully recognized externally. We believe that BC should continue to improve in this area but also find ways to derive more advantage from the work that has already been done.

Research Questions:

- How can BC capitalize on the high degree of ecological sustainability being practiced in the forest sector?
- How can BC continue to improve the sustainability of its practices?
- Can the BC forest sector increase the public and forest product consumers' awareness of illegal logging and poor practices in other parts of the world?
- What is the best strategy for raising awareness of the high ecological standards and sustainability of the BC forest sector?
- How effective have recent publicity efforts been and what are main obstacles to better results?

## **7.6 Continuous improvement – efficiency and fairness in regulating**

While the BC government has undertaken many important reforms of forestry regulations, there are a number of areas where there is room to support the competitiveness of the sector. Two of these are:

- stumpage price calculation mechanisms and scaling rules
- entry and exit from the sector

The BC government has revised its stumpage system numerous times in response to internal factors as well as pressure from the US. We believe that the provincial stumpage system should, above all, transmit accurate and realistic price information through to the stumpage calculation, so that the province (i.e. the public) may receive a fair return for its timber and the correct signals regarding the value of the resource will be sent throughout the sector. We also recognize the importance of other considerations, such as ease of administration, transparency, etc.

Secondly, the larger part of the Crown forest is under licence and it is very difficult for new entrants to come into the sector, short of purchasing an existing company and requesting that its licences be transferred. While there are sound reasons for the development of this system, it tends to deter entry or even re-balancing among current sector participants. We think that it would be worthwhile reviewing the characteristics of the current system and considering whether alternative systems could provide more competition within the sector.

Another area where there is potential to realize improvements for all stakeholders is in the application of technology to regulatory requirements. Improvements in wireless technology, scanning, and software offer the potential for companies to lower their costs of complying with regulations and monitoring their compliance. The same cost savings are potentially available to

government for the same reasons. At the same time, the quality of information and transparency of the overall system can be improved. However, factors rooted in cultural resistance to change (e.g. preference for paper) limit the introduction of such measures. We think that this would be a fruitful area for investigation.

The following research questions are related to regulation:

- How can regulations be designed to accommodate increasing use of technology so that planning, operations and monitoring are streamlined, more flexible, and improved in quality?
- In what areas is there potential to make significant productivity gains in meeting regulations through greater use of technology?
- What are the economic tradeoffs for achieving social / environmental requirements?
- Modify the stumpage system so that more accurate price signals are transmitted to stumpage prices
- What alternate stumpage systems designs can provide accurate pricing?
- What is the most appropriate approach to setting stumpage rates in BC?
- Can incentives be created for improved utilization?
- Improving the application of regulatory requirements through innovative use of technology
- Analyze existing taxation systems and subsidy systems in other jurisdictions and compare to the BC situation. (This applies to growing timber as well as to manufacturing, the treatments of R & D, etc – note that a number of these studies have been done and maybe a consolidation or extension is all that is in order)
- Are there some relatively low-cost changes to the taxation system that would provide greater incentives in support of the sector and bring BC conditions to a level closer to or comparable with other competing countries?

## 8.0 Conclusions

The authors have developed an outline for a comprehensive competitiveness strategy for the BC forest sector. This will be part of a broader sectoral strategy that is being enunciated in other working papers in this series.

The authors fully anticipate that some of the recommendations made here will be revised as more detailed research is undertaken to better understand the nature and interaction of underlying issues and options. It will likely be deemed prudent to prioritize the areas for strategic focus, and the authors have felt that this is best done with the input of a range of sector participants and stakeholders. Two areas that stand out as being among the high priorities are improved gathering and synthesis of business intelligence and improved levels and approaches to R & D and other forms of innovation. To put it bluntly, the BC forest sector is inadequately informed about what its emerging competitors are doing, and what its customers and potential customers want. The key players in the sector need to work together in a more strategic and focused way, and while some such efforts are under way at a national level, the same commitment needs to be applied to implementation. In addition, there is a need to increase overall R & D and create a more innovative culture in the sector as a whole.

BC in particular will face a wood supply crisis within 10 years, precipitated by the impacts of the mountain pine beetle outbreak. Continued declines in wood supply from the coastal region will be a contributing factor. The sector needs to work together to develop the most appropriate strategy to help communities and companies through this looming crisis. Such a strategy needs to recognize and take advantage of the many advantages that BC has in order to successfully re-configure the sector so that it is environmentally, ecologically, and socially sustainable. We believe that BC can rise to this challenge.

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# Annex 1 - The BC Forum on Forest Economics and Policy

The purpose of the Forum is to provide competent, unbiased scientific inquiry into economic and policy issues concerning land management and industry competitiveness of the BC forest sector. The members of the Forum work closely with the public and other organizations to both inform and be informed. The research results are used to improve the well-being of Canadians and their communities and to promote a highly competitive, sustainable, and internationally respected forest sector.

## Mission

The BC Forum is a research and education institute dedicated to improving the present and future well being of Canadians by promoting public dialogue and providing unbiased inquiry on vital economic and policy issues that concern our forests and the values we derive from them.

## Values

Our values guide us in accomplishing our mission.

- We believe that the sustainability and global competitiveness of the forest sector is vital to the well-being of Canadians
- We respect BC's forest lands and wild spaces
- We respect social, cultural and ethnic diversity and seek to understand and consider these differences in fulfilling our mission
- We are a learning organization, dedicated to helping our students and all members achieve their potential
- We are *collaborative*; we value working cooperatively with other organizations to promote public good
- We are *objective*; we provide honest and unbiased inquiry and dialogue
- We are *open-minded*; we seek first to understand, then to be understood

## Goals

- Mobilize the appropriate research expertise to identify the state of knowledge and policy options and their consequences, and conduct research where needs are identified
- Develop an outstanding graduate education and research program at UBC
- Conduct public events each year to stimulate dialogue on priority issues relevant to forest economics and policy in BC
- Publish and present synthesis papers appropriate for an audience of non-specialists. Synthesis papers provide a solid background to current issues and define the important research questions and options
- Organize a speaker series to present innovative viewpoints about the forest sector in BC
- Conduct regional workshops for researchers, stakeholders and students to share ideas and learn from one another
- Develop a plan for media releases and research products that increases the awareness of key economic issues confronting the forest sector

## Annex 2 – Environment and Social Parameters

As summarized in Table 7, following is a more detailed description of the key environmental and social performance indicators that are now being considered for corporate reporting in the forest products sector

### Environment

#### Wood Tracing

This parameter refers to supply chain management. In the forest products sector this more specifically refers to tracing the origin of wood, and is applied to screen for tropical timber, illegally harvested wood, and timber from certified sources. It also helps a company to manage its costs and quality. Extent examines to what degree a company or association chooses to trace wood. Compliance examines what sort of regulatory regime exists to ensure compliance to wood tracing schemes. Third Party Audits examines the presence of independent bodies present during the tracing process.

#### Efficiency

This parameter refers to a company's or association's commitment to increased efficiency in the consumption of resources while producing more goods or services and with less pollution.

**Energy Efficiency** specifically examines whether a company has attempted to reduce power consumption.

**Material Use Efficiency** examines efforts to increase recycling capacity, reduce materials used in the manufacturing process and any other effort to increase resource efficiency.

**Pollution Abatement:** This parameter refers to any efforts to reduce the pollution a company or its products create.

#### SFM Principles

The SFM principles developed in the Montreal Process are as follows:

1. Conservation of biological diversity
2. Maintenance of productive capacity of forest ecosystem
3. Maintenance of forest ecosystem health
4. Conservation and maintenance of soil and water resources
5. Maintenance of forest contribution to global carbon cycles
6. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of society
7. Legal, institutional, and economic framework for forest conservation and sustainable management

## Social

### Community

**Public Reporting (PR):** This parameter examines whether a company or association takes proactive steps to routinely report to the public about its economic, social and environmental efforts and performance.

**Public Involvement (PI):** This parameter examines the role a company or association allows the public to play in making operational and strategic decision-making processes, and in reviewing monitoring results.

**Indigenous Involvement (II):** This parameter specifically examines whether a company or association integrates indigenous peoples into its operational and strategic decision-making processes, and in reviewing monitoring results.

**Compliance with Laws and Regulations (CLR):** This parameter examines whether a company or association makes an overt commitment to comply with the laws and regulations of any country or territory in which they operate. "Reported" indicates that the company provided specific information about their efforts to comply with laws and regulations.

**Self-Regulation (SR):** This parameter examines any efforts by a company or association to regulate its activities independently if operating in a country with inadequate regulatory regimes in terms of a company's environmental and social obligations.

**Protected Areas (PA):** This parameter examines whether a company or association overtly expresses a commitment to preserving any culturally unique or sensitive areas. In this instance, "Reported" indicates that a specific example was given about a company's efforts in this area.

**Education Promotion (EP):** This parameter refers to any efforts by a company or association to help fund and promote institutionalized education in areas in which they operate.

## **Workplace**

**Equal Opportunity Employer (EOE):** This parameter refers to commitments by companies or associations to the promotion of Equal Opportunity Employment. EOE entails hiring regardless of gender, race, class, creed, political alignments, sexual orientation, veteran status and several other factors.

**Occupational Injury Prevention (OIP):** This parameter refers to efforts by companies or associations at curbing incidences of injury or illness on the job site.

**Health and Safety (HS):** This parameter refers to a broad category of commitments made by companies or associations. It includes efforts to improve working conditions and therefore the wellbeing of employees. It also includes efforts to eradicate child labour, promote fair remuneration, and limit hours at work and any other efforts to improve the general well being of employees.

**Professional Education (PE):** This parameter refers to efforts by companies or associations at promoting the education of its employees. This may include, but is not limited to, efforts to help employees plan careers, providing training to improve employees' skills and finally efforts to develop apprenticeship programs to ensure an adequate labour supply for the sector.

**Research and Development (RD):** This parameter examines the nature of commitments made by associations or companies to research and development in the forest products sector. The term examines how companies fund research and academic institutions to improve the quality of forest science and operational and strategic practices.

## **Corporate Governance**

Corporate Governance refers to both transparency and accountability. Transparency is related to both reporting and decision-making. With respect to reporting, it is the provision of regular, reliable and timely information is provided in a manner that is accessible and of sufficient detail and scope, including where appropriate, segregation by geographic region or operating unit. With respect to decision-making, transparency involves providing a record of decisions taken, and information to make an informed decision. Accountability refers to processes being in place, and implemented, to ensure that responsibility is assigned for decisions and outcomes.

## Annex 3 – New Zealand and Competitiveness

Source: Brown and Ortíz 2001

The initial evaluation does not consider absolute numbers, e.g. volume of wood resources, but indicates the relative increase in resources within each country and whether those resources are accessible in physical and economic terms, etc. The same principle was used to evaluate all the variables.

### Evaluation of Forestry Factors (First Stage)

Factor	New Zealand	Australia	Chile	Russia	Sweden	United States
<b>a. Wood Resources</b>						
Availability	doubling	increasing	doubling	increasing	increasing	decreasing
Dispersion	dispersed	dispersed	concentrated	dispersed	concentrated	concentrated
Species composition	radiata pine	Rad.pine, Eucalypt	Rad.pine, Eucalypt	Larch, Spruce, Pine	Spruce, Pine	various
Diversification	low	medium	medium	medium - high	medium	high
Type (natural/plantation)	plantation	mixed	plantation	natural	natural	mixed
Quality	good	good	good	good	good	good
Rotation	short	short	short	long	long	long
<b>b. Wood Processing Development</b>						
Technology	medium - high	medium	medium - high	low	high	high
Industry Diversification	high	medium	high	medium	high	high
<b>c. Market Development</b>						
Value of forest exports (1)	1.24	1	2.36	3	10.3	22.6
Growth in forest exports last 5 years (2)	5.6% per year	13.8% per year	9.8% per year	*	6.1% per year	4.1% per year
No. of forest products exported	*	*	385	*	*	*
No. of countries exported to	50	*	98	*	*	110
Top 5 markets percentage	80	*	53	*	69	56
<b>d. Industry Knowledge</b>						
Labour skills	high - medium	high	high - medium	medium	high	high
Education & Training	high - medium	high	high - medium	medium	high	high
Research & Development	high	high	high	medium - low	high	high
Technology Transfer	medium	medium	high	low	high	high
Export Promotion	medium	medium	high	low		medium
<b>e. Investment Attractiveness</b>						
Wood cost (sawlogs) \$/m <sup>3</sup>	42	40	35	25	65	55
Processing costs	medium	medium	low	low	medium	high
Infrastructure	good	good	good	bad	very good	very good
Exchange rate	favorable	favorable	favorable	favorable	favorable	unfavorable
Government incentives	low	medium	high	low	medium	low
Current Return on Investment	medium	poor	medium	medium	medium	medium
Distance to ports	low	low-medium	low-medium	high	medium	medium
<b>f. Energy</b>						
Electricity cost	low	medium	low	low	low	medium
Electricity availability	good	good	medium	very good	good	medium
Fuel cost	medium	medium	medium	low	medium	low
Fuel importer / exporter	importer	importer	importer	exporter	importer	both
<b>g. Environment</b>						
Forest Industry public image	neutral	neutral	neutral	neutral	good	poor
Environmental legislation	restrictive	restrictive	neutral	non restrictive	very restrictive	very restrictive
Environmental pressure	medium	high	medium	low	high	very high
Forest Industry Sustainability	sustainable	sustainable	sustainable	need attention	sustainable	sustainable

Notes:

(\*) Quantification or evaluation was not possible due to time constraints.

(1) Values in US\$ billion (various sources)

(2) New Zealand exports for 1996-2000 (MAF Statistics), Chile exports for 1997-2000 (INFOR Statistics), USA exports for 1994-2000 (World Trade Atlas GTIS), Australia exports for 95/96

to 99/00 (National Association of Forest Industries), Sweden exports for 1990-1999 (Swedish Forest Industries Association)

In the second stage of construction of the competitiveness index, each variable was assigned a value in a scale of 1 to 10, with 1 being the least competitive value and 10 the most competitive. Each factor was then evaluated using a simple average of the variables. Below is a summary of second stage of evaluation of the forestry factors.

### ***Evaluation of Forestry Factors (Second Stage)***

<b>Factor</b>	<b>New Zealand</b>	<b>Australia</b>	<b>Chile</b>	<b>Russia</b>	<b>Sweden</b>	<b>United States</b>
<b>a. Wood Resources</b>	<b>7.5</b>	<b>6.8</b>	<b>8.3</b>	<b>6.0</b>	<b>6.5</b>	<b>5.8</b>
Availability	10	6	10	9	9	3
Dispersion	5	5	8	5	8	6
Spp. composition	n/a	n/a	n/a	n/a	n/a	n/a
Diversification	2	4	4	5	5	8
Type (natural/plantation)	10	8	10	4	4	5
Quality	10	10	10	10	10	10
Rotation	8	8	8	3	3	3
<b>b. Wood Processing</b>						
<b>Development</b>	<b>8.5</b>	<b>7.0</b>	<b>8.5</b>	<b>3.5</b>	<b>9.5</b>	<b>10.0</b>
Technology	8	7	8	2	10	10
Industry Diversification	9	7	9	5	9	10
<b>c. Market Development(1)</b>	<b>6.7</b>	<b>6.3</b>	<b>8.0</b>	<b>5.0</b>	<b>8.3</b>	<b>8.7</b>
Value of forest exports	6	5	6	7	9	10
Growth in forest exports last 5 years	7	10	9	5	8	6
Diversification of markets and products	7	4	9	3	8	10
<b>d. Industry Knowledge</b>	<b>8.0</b>	<b>7.6</b>	<b>8.8</b>	<b>4.8</b>	<b>9.2</b>	<b>9.2</b>
Labour skills	7	8	7	5	9	10
Education & Training	8	8	8	5	9	10
Research & Development	10	9	9	5	10	10
Innovativeness	n/a	n/a	n/a	n/a	n/a	n/a
Technology Transfer	8	8	10	5	9	9
Export Promotion	7	5	10	4	9	7
<b>e. Investment Attractiveness</b>	<b>7.6</b>	<b>7.4</b>	<b>7.7</b>	<b>5.9</b>	<b>6.7</b>	<b>5.9</b>
Wood cost (sawlogs)	7	7	8	10	4	5
Processing costs	8	8	8	8	7	6
Infrastructure	8	8	7	1	10	10
Exchange rate	9	9	9	10	9	5
Government incentives	6	7	8	5	7	5
Current Return on Investment	5	5	5	5	5	5
Distance to ports	10	8	9	2	5	5
<b>f. Energy</b>	<b>6.8</b>	<b>6.3</b>	<b>6.0</b>	<b>10.0</b>	<b>6.3</b>	<b>8.0</b>
Electricity cost	10	9	9	10	9	7
Electricity availability	10	9	8	10	9	8
Fuel cost	5	5	5	10	5	10
Fuel importer / exporter	2	2	2	10	2	7
<b>g. Environment</b>	<b>7.0</b>	<b>6.8</b>	<b>7.5</b>	<b>8.8</b>	<b>5.5</b>	<b>4.0</b>
Forest Industry public image	7	6	6	8	8	2
Environmental legislation	6	6	8	10	2	2
Environmental pressure	5	5	6	10	2	2
Forest Industry Sustainability	10	10	10	7	10	10

Note:

(1) The variables *Number of forest product exports*, *Number of countries exported to* and *Top 5 markets percentage* were combined into the single variable *Diversification of markets and products*.

Below the wood processing competitiveness index indicates that the USA is the most competitive and New Zealand the least competitive

### **Wood Processing Competitiveness Index**

Country	Base competitiveness index	Forestry Factors							Weighted average index	Ranking
		Resource	Processing Development	Market Development	Industry Knowledge	Investment Attractiveness	Energy	Environment		
New Zealand	6.2	7.5	8.5	6.7	8.0	7.6	6.8	7.0	<b>7.0</b>	5
Australia	7.6	6.8	7.0	6.3	7.6	7.4	6.3	6.8	<b>7.2</b>	3
Chile	6.0	8.3	8.5	8.0	8.8	7.7	6.0	7.5	<b>7.2</b>	3
Russia	3.5	6.0	3.5	5.0	4.8	5.9	10.0	8.8	<b>5.0</b>	6
Sweden	7.8	6.5	9.5	8.3	9.2	6.7	6.3	5.5	<b>7.6</b>	2
USA	10.0	5.8	10.0	8.7	9.2	5.9	8.0	4.0	<b>8.4</b>	1
factor weight	40%	10%	8%	8%	10%	10%	6%	8%	100%	
								60%		

<sup>i</sup> See for example the recent series in the Globe & Mail, July 4 -5, 2005, on the uncompetitiveness of the forest industry in northwestern Ontario.

<sup>ii</sup> CFIC White Paper – Towards an Innovation System that supports a Sustainable Forest Sector. See also PricewaterhouseCoopers 2006. Global Forest and Paper Industry Survey 2005 Edition – Survey of 2004 Results.

<sup>iii</sup> [http://nfdp.ccfm.org/compendium/index\\_e.php](http://nfdp.ccfm.org/compendium/index_e.php); searched April 25, 2005.

<sup>iv</sup> COFI (2000) shows the peak harvest taking place in 1989 at approximately 90 million m3.

<sup>v</sup> Available at web-site <http://www.innovation.gc.ca/gol/innovation/site.nsf/en/in02323.html>

<sup>vi</sup> <http://www.bcprogressboard.com/index.php>

<sup>vii</sup> Vancouver Sun March 31, 2005. “Premier names former NDP foe Miller to new competition council”. Page F3.

<sup>viii</sup> It has been acknowledged that an RS&T strategy has a crucial role to play in delivering the growth inherent in the sector’s vision. Its main functions are to: 1.Enable the delivery of targeted products/solutions to meet international customer demands, both in the short and the long term. 2. These products/solutions may be new wood-based products or supporting technologies that increase the sector efficiency. 3. Provide information and technologies to protect the existing resource, and also export trade in wood products. 4. Provide knowledge on sustainable forest management techniques. 5 Identify and adapt potential (mainly sourced overseas) technologies/product opportunities which are applicable to New Zealand plantation species. 6 Provide the technical platforms and opportunities that will form the basis of new cluster industries. 7. Provide a critical mass of scientists/engineers that can supply technical support to provide credibility over standards, certification, trade access issues, etc.

<sup>ix</sup> Wood Fibre SolutionZ complements and extends the RS&T Strategy by providing a strategic framework which:

- Profiles some of the critical issues that the sector faces
- Documents key Principles and Outcomes required to realise the sector's potential
- Outlines the processes by which these strategies will be implemented, and the competencies required to deliver on the desired outcomes defined (see Processes below)

The RS&T Committee, together with the wider New Zealand Forest Industries Council (NZFIC) committee network, will assist in advancing the research strategy by:

- Improving strategic planning of research and development initiatives through greater industry coordination and the communication of a shared vision and strategy (refer Processes below)
- Identifying and championing research initiatives that are of generic value to the industry
- Providing a forum to identify and synthesise RS&T-based initiatives that are critical to the sector into the industry's RS&T priority framework - via interaction with

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NZFIC committees for Market Access<sup>3</sup>, Safety, Environment & Energy, Communications and Education & Training

- Generating a greater appreciation of the necessity and potential of investment in RS&T - via interaction with the NZFIC Board and the establishment of networks with other NZFIC committees and sub-sector associations
- Providing a forum to analyse and discuss the sector's RS&T portfolio to other NZFIC committees and funding agencies
- In addition, the development of pan-industry market knowledge projects such as the Wood New Zealand initiative will assist in developing RS&T priorities

Processes:

Sub-sector forums - Goals:

- (a) Widely communicate a common strategic vision under which sub-sector organisations can prioritise and develop research initiatives;
- (b) Provide enhanced opportunities for the identification of research synergies between sub-sector organisations; and
- (c) Establish 'Report-back Forums' in which sub-sector representative groups can report on their research priorities and progress to the RS&T Committee.  
[nb: These forums will involve also 'non-traditional' stakeholders, such as those from the construction, engineering and design sectors.]

Science provider forums - Goals:

- (a) Communicate strategies to a range of research providers;
- (b) Foster RS&T networks around the key principles and outcomes identified;
- (c) Provide a forum by which science providers can profile innovative RS&T-based proposals to industry.

Key Principles and Outcomes:

Principles:

- Refined end-user focus - Encouraging a focus on the needs of stakeholders who determine the consumption of wood fibre-based products (e.g., engineers, builders, architects, printers, etc.)
- Refined market focus - Encouraging an increased focus on premium-earning, rather than price-driven, products
- Improved human capital development - Encouraging greater emphasis on recruitment and training of persons to deliver on future needs
- Continual innovation - Encouraging a culture of investment in RS&T and continual innovation within the sector
- Enhanced RS&T effectiveness - Encouraging improved coordination and implementation of RS&T initiatives, together with increased collaboration between providers and industry

Outcomes:

- Improved market knowledge - Improved understanding of market demands, functioning and trends, coupled with increased technical marketing support and communication of priority areas through to research and development initiatives
- Developing solutions and solution components - Developing innovative products and processing systems that yield integrated customer solutions (or the components thereof) rather than merely wood products. -including the integration of wood fibre with other materials, design and engineering expertise
- Improved technology uptake - Ensuring that new knowledge is absorbed broadly within companies, and that technological advances are readily adapted, adopted and embodied into commercially relevant processing and management systems
- Developing international standards - Developing internationally accepted standards in grading, resource assessment and quality control

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- Developing sector-related technology clusters - Identifying and exploiting opportunities to diversify into related activities - not necessarily involving the production and processing of wood fibre as their core business
  - Improved resource knowledge and functionality - Gaining an enhanced understanding of raw materials and developing innovative manipulation / modification technologies in order to tailor / differentiate the resource for end-use performance and market demand -including increased development and utilisation of alternative species that provide superior functional properties
  - Optimising value chain efficiency - Ensuring cost-competitive products through the development of optimised processes and improved logistics
  - Enhanced sustainability - Ensuring long-term resource and environmental sustainability
  - Community integration - Improving the integration of forestry-related activities with neighbouring communities and other land-uses, together with gaining an increased understanding of its influence on workforce wellbeing. This includes preventing and mitigating any adverse socio-economic impacts

<sup>x</sup> Domtar's 2004 Annual Report notes that return on shareholder's equity in 2004 was negative 2%, following negative 8% in 2003 and positive 6% in 2002. Return on shareholder's equity may be lower than ROCE.

<sup>xi</sup> Tembec average ROCE from 1999-2004; 2004 ROCE was positive 3.2%.

<sup>xii</sup> Cascades ROCE was 8.5% in both 2003 and 2004.

<sup>xiii</sup> West Fraser average ROCE from 1999-2004; 2004 ROCE was 14.9%.

<sup>xiv</sup> The most recently available data show a continuation of this general trend, although several BC companies achieved very high ROCE's in 2004. ROCE for the global industry averaged 5.5% in 2004, up slightly over 4.2% in 2003, still far from the target of 10 -12%. Three Canadian producers of lumber and wood products were the top performing companies in the industry during 2004, as measured by ROCE: Ainsworth Lumber (28.2%); Norbord (23.2%); and Canfor (16.2%). As a region Latin America led the way in terms of ROCE at 10.2%. Strong commodity prices, especially for market pulp, enabled Latin American producers to demonstrate their comparative advantages in wood fibre. The growing strength and confidence of Latin American producers was further demonstrated by the growing pace of new investments in the region, at almost double the rate of depreciation and the rate of investment by the industry as a whole.

Source: PWC 2004 2005 Global Forest and Paper Survey. Available at:

<http://www.pwcglobal.com/extweb/pwcpublishations.nsf/docid/e1f575ac5d728ff88525703c00287953>. Accessed July 13, 2005

<sup>xv</sup> We note that a BC-specific re-investment ratio was not provided by PricewaterhouseCoopers (2005). We also note that ROCE is not a universal indicator of corporate health – a high ROCE may be due to fortuitous circumstances (e.g. low stumpage rates on salvage wood, or a spike in product prices) and it may reflect a company coasting on earlier investments.

<sup>xvi</sup> Pearse (2001) anticipated that the future coastal industry will evolve from 14 large pulp and paper mills, 47 large sawmills and 44 shake and shingle mills to one with about the same number of large pulp and paper mills, half as many sawmills, and fewer shake and shingle mills. Most of the future pulp and paper mills cannot be created by re-configuring existing mills.

<sup>xvii</sup> Developments in certification are relevant here since it is another means to express social and environmental objectives. Currently, there are three major schemes, CSA, FSC and SFI. Overtime the distinction is lessening with the exception of a few key social areas – public participation, indigenous people and worker training.

<sup>xviii</sup> For a full description of these parameters please refer to Appendix 1.