



Report on the Economic Impact of the BC Pulp and Paper Industry

**Prepared for
BC Pulp and Paper Industry Task Force**

November 2007

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November 15, 2007

Private and Confidential

Mr. David Gandossi
Chair
BC Pulp and Paper Industry Task Force
Suite 2840, 650 West Georgia Street
Vancouver, BC V6B 4N8

Dear Mr. Gandossi:

Subject: Report on the Economic Impact of the BC Pulp and Paper Industry

Please find enclosed our report summarizing the economic impact of the BC pulp and paper industry.

Thank you for providing us with the opportunity to assist the industry with this important advocacy initiative. Please contact me (604 806 7603) or Linda Castagna (604 806 7524) if you have any questions.

Yours truly,

W. L. Craig Campbell
Incorporated Partner
Global Forest and Paper Practice

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Terms of Reference

This report has been prepared at the request of the BC Pulp and Paper Industry Task Force to improve stakeholder knowledge and understanding of the pulp and paper industry in British Columbia.

We provide no opinion, attestation or other form of assurance with respect to our work or the information upon which our work is based. The procedures we performed in preparation of this report do not constitute an examination or a review in accordance with generally accepted auditing standards or attestation standards. We did not audit or otherwise verify the information supplied to us in connection with the preparation of this report.

This report is to be used solely by the BC Pulp and Paper Industry Task Force.

Source Data

To prepare this report, we reviewed the following material:

- PricewaterhouseCoopers reports:
 - Forest Industry in BC Report, prepared for the Council of Forest Industries
 - Market Pulp Benchmarking Study
 - BC Solid Wood Benchmarking Study
- Statistics Canada and BC Stats information
- Media articles
- Tax legislation
- Ministry of Forests and Range - Harvest Billing System
- Company websites and annual reports
- Industry publications
- Discussions with company representatives

Definition and Glossary

For purposes of this report, the BC pulp and paper industry includes the following primary mills in British Columbia:

Company	Location	Market Kraft Pulp ⁽¹⁾	Uncoated Groundwood Papers ⁽²⁾	CTMP and Other Paper ⁽³⁾
Abitibi	Mackenzie		√	
Canfor	Taylor			√
Canfor Pulp	Prince George	3 mills		√
Cariboo Pulp	Quesnel	√		
Catalyst	Campbell River	√	√	
	Crofton	√	√	
	Port Alberni			√
	Powell River		√	
Domtar	Kamloops	√		
Howe Sound	Port Mellon	√	√	
Kruger	New Westminster			√
Mercer	Castlegar	√		
Neucel	Port Alice	√		
Pope & Talbot	Mackenzie	√		
	Nanaimo	√		
Tembec	Chetwynd			√
	Skookumchuk	√		
West Fraser	Kitimat			√
	Quesnel			√

(1) Referred to in this report as Market Pulp.

(2) Also referred to in this report as Newsprint and/or Groundwood Specialty Papers.

(3) Referred to in this report as Other Pulp and Paper.

The following industry terms are used throughout the report:

BDU – Bone Dry Unit. A measure of chip volume commonly used in the BC Interior. By definition, a BDU of pulp chips weighs 2,400 pounds when oven dry. The solid wood equivalent volume in a BDU of chips varies with species and density.

BEK – Bleached Eucalyptus Kraft pulp. Pulp made from eucalyptus trees found mainly in the southern hemisphere.

By-products or residual chips – wood chips produced as part of the lumber or plywood production process.

Cash conversion costs – total costs to produce pulp, excluding fibre and depreciation.

CTMP – chemi-thermo mechanical pulp.

FTE – Full Time Equivalent employees. An FTE is deemed to work 1,950 hours per year (52 weeks at 37.5 hours per week).

Mill Net – net revenue realized by the mill. Calculated as gross sales revenue, net of freight, commission, trade and cash discounts and other export taxes.

NBSK – Northern Bleached Softwood Kraft pulp. Pulp made from the strong, lengthy fibres of softwood trees found in the northern hemisphere.

Net earnings (loss) – operating earnings (loss), less allocated interest (based on capital employed) and allocated income taxes (in the proportion that operating earnings bear to net earnings).

ROCE – Return on Capital Employed. A ratio used to understand the profitability of a company or industry. Calculated as net earnings (loss) plus after-tax interest expense, as a percentage of year-end capital employed. An ROCE of 12% is the generally accepted minimum for an industry.

Stumpage – revenue collected by the provincial government in exchange for consumption of Crown timber.

Note: all \$ references in this report are in Canadian currency, unless otherwise noted.

Executive Summary

The BC pulp and paper industry contributes over \$4 billion annually to the economy of British Columbia. Beneficiaries of the industry include employees, communities, government, the solid wood industry and, when the industry is profitable, shareholders.

The BC pulp and paper industry provides a significant number of well-paying jobs for the provincial workforce. Directly, over 10,000 employees earn a living from the pulp and paper industry, which indirectly provides employment for some 20,000 additional people. The pulp and paper industry is estimated to pay \$1 billion annually in compensation and benefits directly to, and on behalf of, its employees. The average hourly employee in a BC pulp mill earns \$96,000 per year in salary and benefits, making pulp and paper the second highest paying industry in BC next to mining, oil and gas.

Although declining employment in the industry raises concerns about job security for existing employees, in fact employers face a significant challenge attracting and retaining sufficient numbers of skilled workers to replace aging employees.

The pulp and paper industry in BC contributes \$600 million annually to all three levels of government, which benefit greatly from the industry itself through taxes, assessments and other government revenues, and also from the employees, who contribute significantly to government revenues.

The pulp and paper sector contributes revenues to government, irrespective of whether the companies are profitable – through the federal Large Corporations Tax, provincial and municipal property tax, provincial sales tax, the pulp portion of provincial stumpage payments, and federal and provincial employee tax withholdings, CPP and EI.

Pulp and paper mills in BC are frequently located in small towns, which become economically dependent on the mills for municipal taxes and employment. When mills are operating near capacity and experiencing positive financial results, the benefits of being a mill town reach far beyond the jobs created and taxes paid. BC communities benefit from the industry's support of local activities and infrastructure.

The symbiotic relationship between the solid wood sector and the pulp and paper industry in BC helps ensure overall value is extracted from the Crown resource (timber). The pulp and paper industry contributes in excess of \$1.5 billion to the solid wood sector by consuming residual chips (by-products) from the sawmilling industry. This value-added process not only supports the sawmill companies, but also generates more work for pulp and paper employees, further payments to government by pulp and paper mills, returns to pulp and paper shareholders, and a stronger and more diversified economic base for the people of British Columbia.

Pulp and paper producers have a tremendous social responsibility to care for the air and the water on which their mills rely. According to the industry, BC pulp and paper facilities greenhouse gas emissions were 62% less in 2006 than 1990, despite increased production volumes during that

period. The reduction achieved by BC mills is ten times the 6% reduction in greenhouse gas emissions by 2012 committed to by Canada in ratifying the Kyoto Accord. As reported by the industry, the greenhouse gases that were not emitted by the BC pulp and paper industry in 2006, in comparison to 1990 levels, are the equivalent of removing the emissions of over 600,000 vehicles.

Unfortunately, one significant stakeholder is not currently benefiting from the BC pulp and paper industry: the shareholders. The Return on Capital Employed (ROCE) has not exceeded 12% in any subcomponents of the industry for the past ten years, and the average for the 20 years between 1986 and 2005 has been significantly below the minimum expected 12% threshold. The industry cannot provide high paying jobs to its employees, contribute to government revenues, support local communities and purchase by-products from the solid wood sector unless it earns sufficient profits to generate a reasonable return on investment for its shareholders.

Market pulp and newsprint prices have shown little upward trend over the past 20 years, and being a commoditized industry, it is critical for BC pulp and paper operations to minimize costs and be globally competitive in order to generate positive earnings. The earnings over the past 20 years have not met the minimum threshold expected by the shareholders. Additional investment is required to upgrade the mills and achieve lower costs; however, further investment will be hard to attract without reasonable expectation of a proper return.

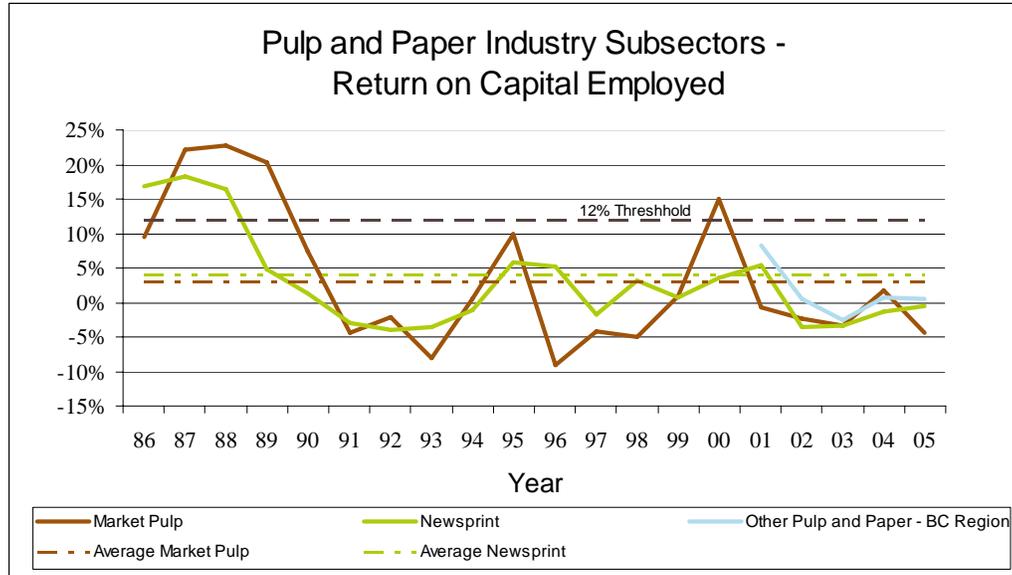
Report Results

The economic impact of the BC pulp and paper industry is measured by the tangible and intangible benefits attributable to the industry realized by the stakeholders of the industry. Stakeholders include owners of the operations (shareholders), owners of the resources consumed by the industry (residents), employees, and suppliers of the industry. Tangible benefits include profits earned by the owners of the industry's operations, employment for BC residents (direct and indirect jobs), and revenues received by the various levels of government. Intangible benefits include efforts made by the industry to be good corporate citizens in the communities in which they operate.

This report outlines the tangible and intangible benefits of the industry to its stakeholders.

Industry Profitability and ROCE

The BC pulp and paper industry has been struggling to generate positive financial results for an extended period. A Return on Capital Employed (ROCE) of 12% is considered to be the generally accepted minimum for a healthy, sustainable industry. ROCE has not exceeded 12% in any subcomponents of the industry for the past ten years and the average for the 20 years between 1986 and 2005 has been significantly below the 12% threshold, as shown in the chart below:



Source: PricewaterhouseCoopers

The average ROCE over the 20-year period from 1986 to 2005 was:

- Coastal Market Pulp: 2.8%
- Interior Market Pulp: 7.1% and
- Newsprint and Groundwood Specialty Papers: 4.2%

The pulp and paper industry is highly capital intensive, so a significant level of earnings is required to generate a reasonable ROCE.

The following table outlines the net earnings (loss) of the BC pulp and paper industry over the five years from 2001 to 2005:

Net Earnings (Loss) (\$ millions)	2001	2002	2003	2004	2005
Market Pulp	(147)	(174)	(113)	20	(143)
Uncoated Groundwood Papers	135	(85)	(83)	(33)	(12)
Other Pulp and Paper (estimate)	67	4	(23)	6	6
Combined Net Earnings (Loss)	55	(255)	(219)	(7)	(149)

The market pulp sector has earned a paltry \$164 million over the 20-year period from 1986 to 2005. The sector has incurred net losses in 12 of those 20 years. In the five-year period from 1986 to 1990, the sector generated net earnings of \$2.2 billion. However, those profits were completely eliminated over the following 15 years; the total net loss experienced in the market pulp sector between 1991 and 2005 was \$2 billion.

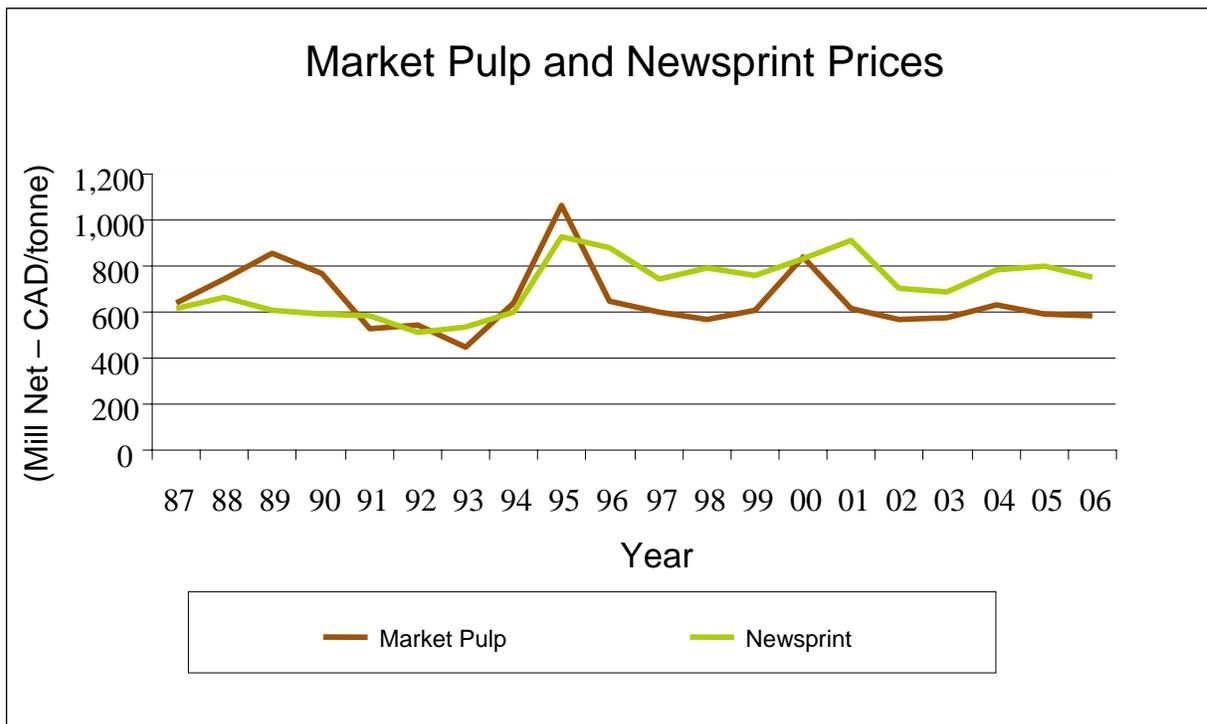
A similar story exists for the BC newsprint sector where newsprint has suffered net losses for 11 of the 20 years in this period. The total net loss over the 20-year period (1986 to 2005) was \$37 million. As with pulp, the net earnings between 1986 and 1990 of \$456 million were completely wiped out by a total net loss of \$493 million between 1991 and 2005.

The profitability of the pulp and paper industry depends on the price of the end product. The BC industry tends to be profitable in years of higher prices and incur net losses in years of lower prices. Pulp and paper are global commodities, and as such, BC producers are price takers in the global market and have limited ability to influence prices.

The BC pulp and paper industry is not alone with its poor financial results. The global industry, with the exception of BEK mills in South America and Asia, is suffering from reduced revenues, mainly due to over-capacity of pulp and paper production. NBSK has been used indiscriminately in the past because of its superior properties and favourable pricing brought about by excess supply. Paper producers focused on cost reduction have developed new paper recipes that allow for substitution of NBSK pulp with less expensive BEK. As a result, BC has seen its share of mills disappear over the past 20 years. The Gold River newsprint mill closed in 1993 and the pulp mill followed in 1998, Norske Canada's pulp mill at Powell River shut down in 2001, and Western Pulp's Woodfibre (Squamish) mill closed in 2006. The pulp mill in Prince Rupert has been on the brink of resurrection since Skeena closed its doors in 2001, and the Port Alice mill was given a new life by Neucel in 2006. Other mills have channelled their investments to higher value paper production rather than market pulp, especially on the Coast, to try to reduce their dependence on cyclical commodities.

Market Price

As illustrated in the graph below, market pulp and newsprint prices have shown little upward trend over the past 20 years. Prices for both products have similar cycles and the most recent peak was in 1995. The prices in the following chart are not adjusted for inflation. In 1992 dollars, net mill realization for pulp was over \$750 per tonne in 1986 and only \$460 in 2006. Because BC pulp and paper operations are experiencing periods of downward price pressure, it is critical for the industry to minimize costs and be globally competitive.



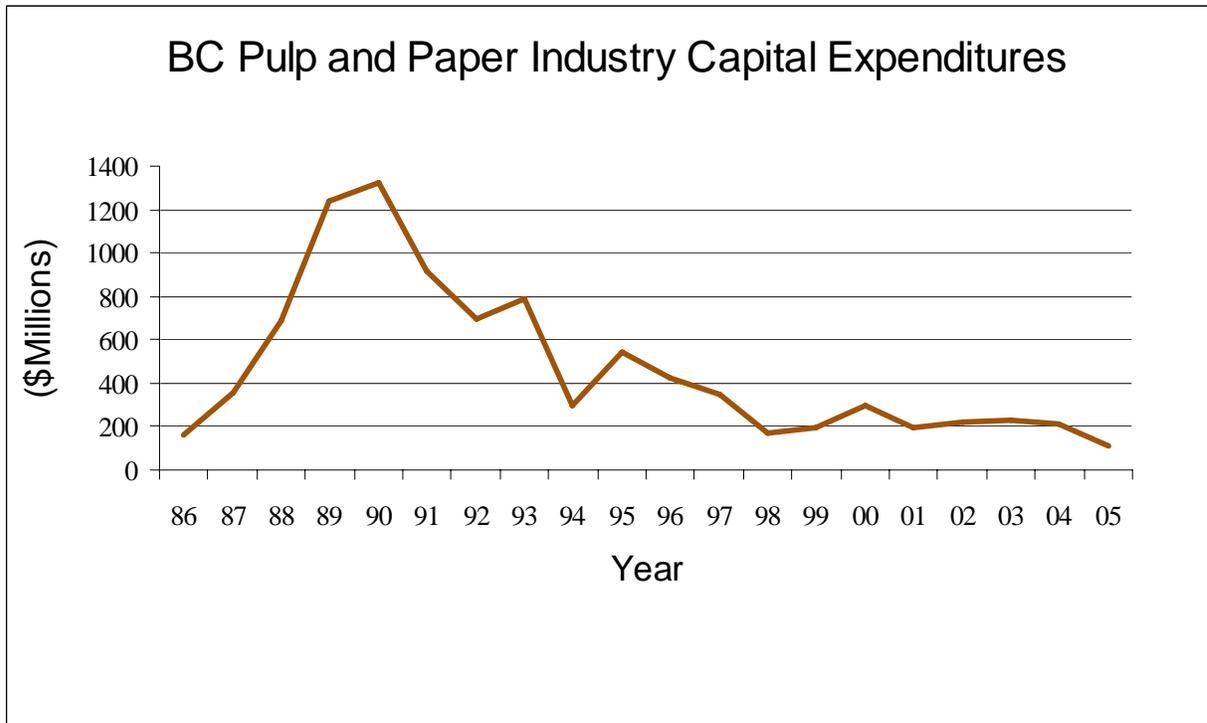
Capital Expenditures

The poor economic returns of the industry have resulted in limited re-investment, contributing to further poor economic returns. The table below depicts the decline in capital expenditures in market pulp and newsprint over the period from 1986 to 2005:

Total Capital Expenditures (\$ millions)	1986 to 1995	1996 to 2005
Market Pulp	4,523	1,359
Newsprint	2,471	826

As noted in the graph below, over the 20-year period from 1986 to 2005, the most significant capital expenditures were made between 1989 and 1993 when Howe Sound Pulp and Paper underwent a significant expansion and modernization program as did the Celgar (Mercer) mill in Castlegar. In

addition, new environmental regulations were enacted during this timeframe. In the ten years between 1989 and 1998, the market pulp mills invested \$1.3 billion to make their production processes more environmentally friendly, slightly more than the \$1.2 billion invested over the same period in projects to reduce costs or increase revenue at the existing operating level. The capital projects focused on the environment were split almost equally between improving air quality and improving water quality. Minimal capital spending has occurred since the late 1990s. In fact, the industry has recently been in a period of de-investment, where annual depreciation exceeds annual capital spending, a situation that is not sustainable.



Source: PricewaterhouseCoopers

Employment and Compensation

The BC pulp and paper industry provides a significant number of well-paying jobs for the provincial workforce. The inter-dependency between the solid wood sector (lumber and logging) and the pulp and paper sector is significant, especially when considering employment levels. The lumber and logging industry depends heavily on the pulp and paper industry for use of residual chips and pulp logs, and the pulp and paper industry relies on the lumber and logging sector for fibre supply.

FTE Analysis

The following table shows the average number of full-time equivalent positions (FTEs) in the BC forest industry for several of the years between 1986 and 2005:

	1986	1996	2001	2005
Market Pulp	6,900	7,500	6,100	5,000
Newsprint	4,100	3,700	3,300	3,500
Other Pulp and Paper (estimate)	n/a	n/a	2,400	2,000
Pulp and Paper sector total	n/a	n/a	11,800	10,500
Lumber	29,300	23,700	19,200	16,800
Plywood and Veneer	5,100	3,300	3,600	3,600
Logging (company and contractor)	27,000	30,500	26,800	23,500
All other sectors (value added, provincial government, silviculture)	n/a	n/a	24,200	23,000
Total direct employees in BC Forest Industry	94,600	99,100	85,600	77,400

Source: PricewaterhouseCoopers

Capital investments made out of necessity to reduce costs have increased capacity in the industry without a corresponding increase in employment levels. As reported by BC Stats, in 1996 the paper manufacturing industry employed 22,900 people in British Columbia. In 2001, paper manufacturing industry employment levels had dropped to 15,000 people and by 2005 employment had decreased further to 12,300 people. In contrast, BC's total labour force grew by 21% over the ten years from 1996 to 2005. As a result of investment in modernizing plants, the average market pulp mill currently produces 0.86 tonnes per FTE compared to 0.53 tonnes per FTE in 1986.

Although declining employment in the industry raises concerns about job security for existing employees, in fact employers face a significant challenge attracting and retaining sufficient numbers of skilled workers to replace aging employees. The average age of the pulp and paper industry union workforce is 45 years.

Indirect Employment

The BC pulp and paper industry generates significant employment outside the industry. Suppliers to the industry, such as transportation providers, fuel companies, office supply companies and construction workers, depend on the industry for employment but are not categorized as forestry workers in provincial statistics. In addition to the indirect employment generated by the industry, significant tertiary employment is created when pulp and paper employees spend their pay cheques on such services as taxis, restaurants, hotels and cars.

Using a common industry multiplier of 2.0—that is, for every direct job, an additional two other jobs are created—the nearly 80,000 people currently employed full time by the forest industry create an additional 160,000 jobs for others, for a total of 240,000.

Annual Compensation and Benefits

Forestry workers are very well compensated and have achieved significant benefit packages as a result of historically strong union negotiations. The average hourly employee in a BC pulp mill earned \$64,000 in compensation in 2005 and a further \$32,000 in benefits, for a total of \$96,000 per year. The average forestry worker in BC earned \$51,800 in compensation in 2005 and a further \$19,000 in benefits. In comparison, the average employee earned \$37,000 in BC or \$37,700 in Canada, with very few benefits. Using the pulp sector's average hourly compensation and benefits, the pulp and paper industry paid approximately \$1.0 billion in compensation and benefits to, or on behalf of, its employees.

Of the major BC industries selected for review, pulp and paper industry workers are the second highest paid, only slightly behind mining and oil and gas workers. Wages for forestry workers in BC are approximately 30% higher than the average BC industrial wage. The table below compares compensation earned by a forestry worker in BC to other industries and to Canada as a whole in 2005:

Average Annual Compensation (\$)	2005
All Canada workforce	37,727
All BC workforce	37,053
<i>Significant BC Industries:</i>	
Mining, oil and gas	69,047
Forestry	51,760
Professional, scientific and technical services	48,355
Manufacturing	45,617
Construction	43,884
Health care and social assistance	35,220
Trade	30,218

Source: Statistics Canada, except Forestry which is sourced from PricewaterhouseCoopers

Economic Dependence

Pulp and paper mills in BC are frequently located in small towns, which become economically dependent on the mills. A 2004 Economic Dependency Report by BC Stats analyzed 29 communities outside Greater Vancouver in 2001. In ten of those 29 communities, the forest industry was the number one employer, second only to the public sector, which was the main employer in 15 communities. In those 29 communities, the forest industry provided employment for an average of 27% of the workforce.

When mills are operating near capacity and experiencing positive financial results, the benefits of being a mill town reach far beyond the jobs created and taxes paid. Despite its recent financial performance, the BC pulp and paper industry continues to demonstrate corporate generosity by making large donations to hospital foundations and scholarship funds and sponsoring and contributing to community recreational facilities, activities and other infrastructure such as schools, hospitals and water treatment processes. However, when operations close as a result of poor economic performance and better use of available capital elsewhere, the economic impact to the community can be significant.

Payments to Government

The BC pulp and paper industry is a significant contributor to the revenues of the three levels of government: municipal, provincial and federal. There are varying sources of government revenue – driven by income, investment and production inputs.

Income Tax

The BC pulp and paper industry is subject to income tax on its taxable earnings. The federal tax rate for a typical BC pulp and paper facility is 22%, and an additional 12% income tax is charged by the provincial government. A 3% credit is available for qualifying manufacturing and processing property in BC.

Given that the industry has been in a net loss position for many of the past 20 years, actual income tax payments have not been significant.

Capital Tax

The Large Corporations Tax (LCT) was implemented by the federal government in 1996. Since it is a tax on the infrastructure of the industry and does not fluctuate relative to earnings, it becomes a fixed cost to the companies. The tax rate is 0.225% on all taxable capital above a corporate threshold of \$50 million. Therefore, for a typical BC mill with taxable capital of \$300 million, the LCT collected by the federal government is over \$500,000.

Another form of capital tax is property tax charged to the industry by municipal governments and regional tax authorities. Property taxes paid by pulp and paper mills are significant due to the size of the land base covered by the mills. Pulp and paper facilities in BC pay property taxes that equate to a range from \$8 and \$14 per tonne of pulp and paper produced, or 3% of cash conversion costs.

Commodity Taxes and Other Government Revenue

The government also collects revenue from the industry based on consumption of materials in the production process, including stumpage, sales, water, fuel and electricity. These costs vary in

relation to production levels but not profitability. As a result, governments receive significant revenue from the industry even when shareholders are left covering financial losses.

Stumpage - The provincial government collects payment for consumption of the Crown resource by charging stumpage on each cubic metre of Crown timber harvested. Until recently, stumpage rates varied in relation to the quality of wood harvested, the cost of harvesting the wood, and the market price of the products produced from the harvested timber. Recent changes to the stumpage system have made the market price for timber the primary factor influencing the stumpage rate.

Sawlogs attracted an average stumpage price of \$16 per m³ in 2005 but stumpage has been as high as \$29 per m³ within the past ten years. Since residual chips represent approximately 10% of the revenue earned from the log, the pulp industry's cost of residual chips includes approximately \$1.50 per m³ of stumpage paid to the provincial government in 2005 and an average of \$2.00 per m³ over the past decade. The table below shows stumpage trends in BC over the past ten years:

Average Provincial Stumpage (\$ per m ³)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Stumpage, Royalties, Rents, etc.	25.19	28.66	24.44	20.63	21.87	18.75	19.50	17.02	16.79	15.72

Source: PricewaterhouseCoopers

Pulplogs are lower value timber and therefore the stumpage rate is only \$0.25 per m³.

Assuming production of 4.2 million tonnes of pulp annually in BC, approximately 25 million m³ of chips are consumed. Using an average fibre diet of 90% residual chips and 10% chips from pulp logs, stumpage attributable to the BC pulp industry in 2005 was over \$30 million.

Sales tax – BC has a provincial sales tax (PST) of 7%. PST is charged on most goods and services consumed by the industry. As a high level estimate, a typical mill purchases at least \$100 per tonne of taxable supplies, excluding energy and fuels, for a total of \$7 per tonne of sales tax. With over 4 million tonnes of pulp and 3 million tonnes of paper produced annually in BC, that equates to almost \$50 million in PST, excluding taxes on capital spending, which are an estimated further \$10 million.

In addition to consumable supplies, the industry pays PST on fuel and electricity. In 2006, an average pulp and paper mill in BC consumed \$13 million in fuel and \$20 million in electricity. The resulting PST paid annually by each mill on fuel and electricity is approximately \$900,000 and \$1.4 million, respectively.

Employee Withholdings

In addition to taxes paid by the industry itself to the federal government, employees pay significant federal tax and the industry also contributes to the federal government on behalf of its employees.

For a typical wage of the pulp and paper industry (e.g., \$65,000 per year), the following taxes relating to employees are paid:

<i>\$ per Employee</i>	Employee	Employer	Total
EI	\$ 729	\$ 1,022	\$ 1,751
CPP	1,911	1,911	3,822
Provincial Income Tax	15,635	0	15,635
Federal Income tax	12,351	0	12,351
Total	\$30,626	\$ 2,933	\$33,559

Source: Canada Revenue Agency

Based on the 10,500 employees in the pulp and paper sector in 2005, total government revenue from those employees was in the neighbourhood of \$350 million, excluding taxes from employee benefits.

In summary, the three levels of government receive over \$600 million annually from the BC pulp and paper industry, irrespective of whether the companies are profitable.

Type of Tax	Estimated Annual Tax Paid by BC Pulp and Paper Mills (\$ millions)
Income Tax	0
Large Corporations Tax	10
Property Tax	100
Stumpage	30
Sales Tax – Supplies and Capital	60
Sales Tax – Fuel and Electricity	50
Taxes on behalf of direct employees	350
Total	>600

Fibre Supply

Overview

British Columbia has a total land base of 95 million hectares, of which 60 million hectares, or 63%, is covered by forests. Fibre is a Crown resource in BC and approximately 90% of the annual harvest volume is from Crown lands, while the remaining 10% is from private lands. Government policies and regulations are established to maximize the value of the Crown resource to the

taxpayers of the province. Value is established through stumpage, a tax paid to the government by consumers of the timber, and employment in the forest industry.

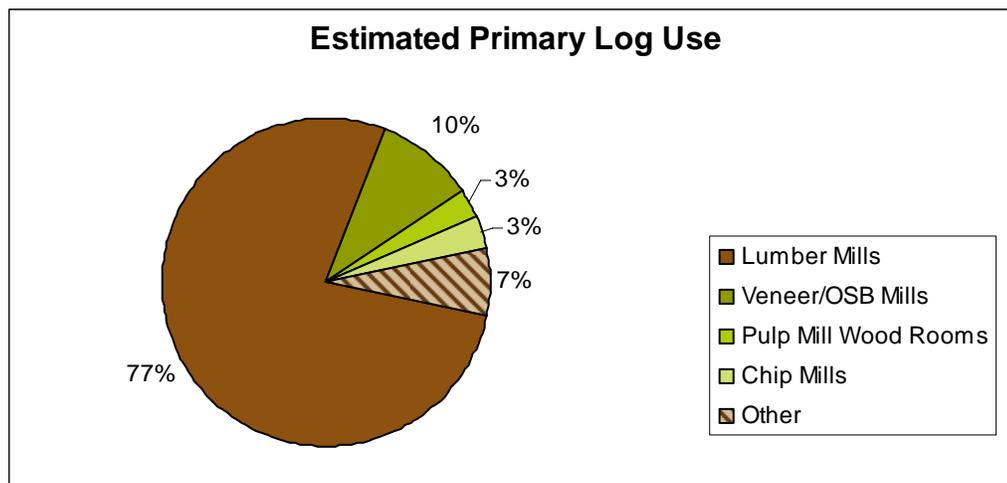
The pulp and paper industry is a significant consumer of fibre in the province. Final products produced by the mills in the BC pulp and paper industry are made from whole logs, residual chips, slush pulp or dried pulp.

The industry includes:

- market pulp mills that produce pulp from chips and dry the pulp into sheets
- pulp and paper mills that initially produce pulp from chips and then further refine the slush into paper
- paper mills that produce dry pulp sheets into paper.

Proximity to high quality fibre gives the BC pulp and paper industry a competitive advantage; however, the distance to the final consumer creates a challenge. Because high value paper produced from BC fibre is heavy, it is expensive to transport; it is also expected to be of a certain quality and there is a risk of damage during transit.

The following chart shows the estimated primary use of the annual provincial log harvest. Residual chips are sourced from lumber mills as a by-product that is further processed.



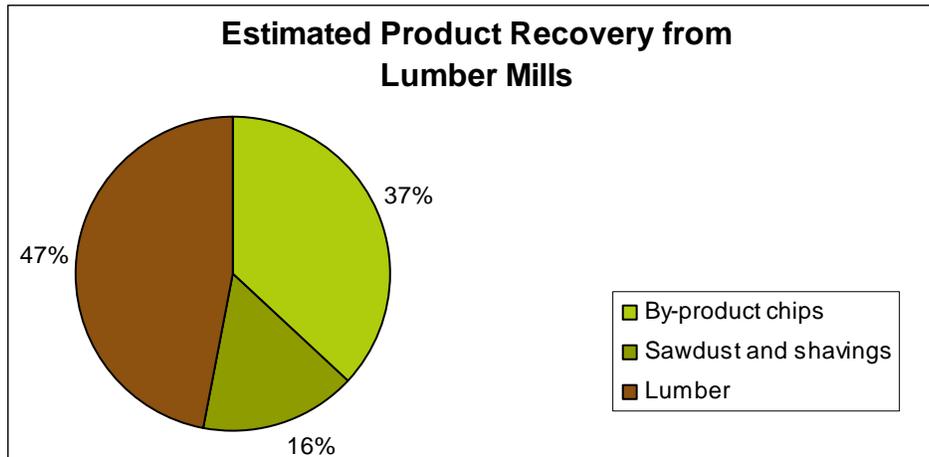
Source: Statistics Canada and BC Ministry of Forests

Residual Chips

Residual chips are the most economic source of fibre for the BC pulp and paper industry. The pulp and paper sector's consumption of residual chips is a value-added use of Crown timber. Sawmills and other solid wood processing facilities process logs into their final products and chips are produced during the process. The chips are collected and stored by the solid wood facilities. The

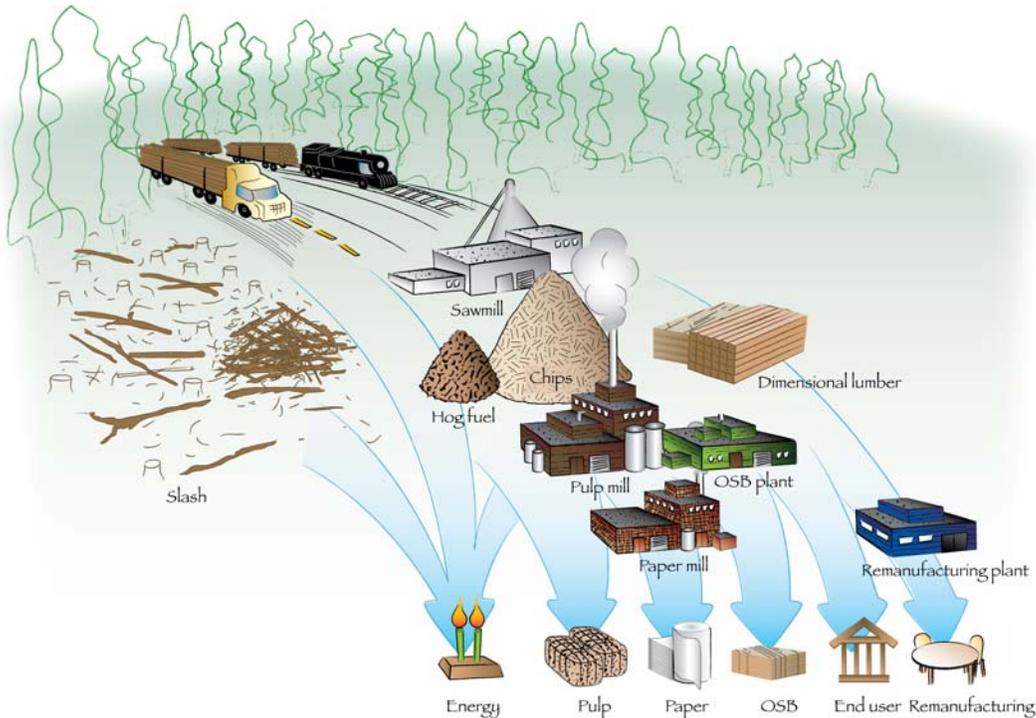
pulp and paper mills buy chips from the sawmills and cover the shipping costs to deliver them to the pulp and paper facilities where they are further processed into pulp and paper.

The following chart depicts the average product recovery from a typical BC Interior sawmill:



Source: Forintek Canada Corp.

The following diagram illustrates the flow of fibre within the BC forest industry:



The consumption of residual chips and hogfuel by the pulp and paper industry is a symbiotic relationship with the solid wood sector and evidence of the value the pulping process adds to the consumption of fibre as a natural resource. Sawmills receive on average \$35-45 per m³ of fibre consumed, or \$10 per m³ of fibre consumed, from the sale of residual chips – approximately an additional 10-20% on top of the revenue earned from the sale of lumber, so a significant benefit to sawmills. Most pulp mills have long-term contracts with sawmills to provide certainty over their source of fibre and the contracts typically provide for the price of chips to vary in relation with the market price of pulp. Historically, the lumber and pulp price cycles have peaked at different times, so sawmills stand to benefit from increased chip revenue when they are suffering from reduced lumber prices.

The benefit to sawmills of selling residual chips to pulp mills is often underestimated. When the industry has been in a situation where the pulp mills are closed and the sawmills are still operating (e.g., during labour disruptions), the sawmills often have to close as well. Residual chips have a limited shelf life, there is limited storage space, and it is not economically viable to continue operations without the revenue from the sale of the residual chips. While the ability of pulp mills to consume the hogfuel produced as a by-product at sawmills does not financially benefit the sawmills, it does mean they don't have to dispose of the waste in another manner.

Whole Log Chips

If pulp mills are unable to obtain sufficient residual chips at an economical price from nearby sawmills, they sometimes rely on whole log chipping. Some pulp mills, especially on the Coast, have a woodroom and can chip whole logs on site. Other mills have whole log chipping facilities nearby. Low grade logs of insufficient quality for processing into lumber or plywood are chipped entirely. They are harvested along with the sawmill quality logs in the bush and are then traded or sold to pulp mills or whole log chipping facilities. This market for the low grade logs helps the loggers who would otherwise leave the pulp logs as salvage in the woods or leave the trees standing, increasing the cost of the harvest process on each cutblock and the risk of accidents during harvest.

Residual chips are the most common source of fibre for pulp mills. Most BC and Canadian pulp mills consume 90% residual chips and 10% whole logs and sawdust. Because whole log chips require a log to be processed into chips, they cost approximately 30% more than residual chips. Fibre is the single largest cost component of a tonne of pulp, at approximately 35%. In the BC Interior, fibre currently costs approximately \$150 per tonne of pulp produced.

Fibre as a Crown Resource

Pulp mills consume approximately 6 m³ of fibre per tonne of pulp produced. Based on a total BC NBSK pulp production volume of 4 million tonnes, 25 million m³ of fibre is consumed annually. At an average price of \$90 per BDU or \$35 per m³, the market kraft pulp industry contributes close to \$1 billion of benefits to the sawmilling industry, by further refining the residual chips.

Additional benefits are realized by the sawmilling industry on any raw fibre consumed by the paper sector and the three CTMP mills in BC.

Alternative Uses of Fibre

The traditional fibre flow of the BC forest industry is being challenged by the energy sector. The temporary uplift in available fibre as a result of the mountain pine beetle epidemic, combined with the current economic situation in the BC forest industry (low lumber prices, relatively high pulp and paper prices, strong Canadian dollar), means alternative uses for BC fibre are being considered. Unless incentives and penalties are applied equitably, the forest and paper industry may see fibre being diverted to the energy sector.

Certain alternative uses of pulp logs, residual chips and hogfuel offer additional sources of revenue for pulp and paper plants and for other producers with access to BC fibre. One of these alternatives is pellets. BC pellet production capacity is approximately 600,000 tonnes per year, spread over 12 plants. More than 80% of this production is currently being sold in Europe. European demand for wood pellets is expected to increase 150% by 2010 and Canada is viewed as a secure supplier of quality wood pellets.

British Columbia is blessed with significant biomass resources such as woody debris, agricultural crop residues, animal manure and municipal wastes that can be used to produce heat, electricity, liquid fuels and other forms of energy. These resources are renewable, distributed throughout the province, and suitable for either large-scale or smaller, community-based energy production opportunities. Wood pellet production, wood-fired electricity generation and cogeneration are already well established in British Columbia, with wood gasification, liquid biofuel production and other bioenergy/biorefining technology also well positioned to play a significant role in British Columbia's energy future.

British Columbia currently leads the nation in wood energy production and consumption, with about 50% of Canada's biomass electricity generating capacity. Mill residues currently incinerated in beehive burners provide no energy recovery and also cause adverse impacts on local air quality. Wood residue is expected to increase in the short term while the mountain pine beetle infestation takes its toll on the standing timber. These resources, and abundant wood residues in other regions throughout the province, present an opportunity for increased bioenergy production in British Columbia.

Environment

Emissions Regulations and Initiatives

Pulp and paper operations are heavily integrated with the air and water. The industry has always been extremely conscious of its impact on the environment. Comprehensive regulations were implemented in the early 1990s that strengthened the already good care the industry was taking of the environment. Companies in the Canadian pulp and paper industry today strive to obtain certification under the International Organization for Standardization (ISO) 14001 and many

companies have met these standards for several years running. ISO 14000 is a series of international, voluntary environmental management standards developed to address such things as Environmental Management Systems (EMS), Environmental Auditing and Related Investigations and Environmental Performance Evaluations.

Canada has the world's largest area of forests certified as sustainable by third parties. In addition to the ISO 14001 certification, Canadian companies have obtained certification through the Sustainable Forestry Initiative (SFI) Standard, the Canadian Standards Association (CAN/CSA Z809) and the Forest Stewardship Council (FSC).

Given its integration with the environment, the industry has a tremendous social responsibility to care for the air and the water on which its mills rely. A significant number of recent initiatives by pulp and paper producers relate to reducing greenhouse gas emissions of pulp and paper mills. According to the Forest and Paper Association of Canada (FPAC), between 1990 and 2006 FPAC member pulp and paper facilities across Canada reduced their greenhouse gas emissions by 44%, while increasing production volumes. The BC pulp and paper sector is leading the national reduction in greenhouse gases. According to the industry, BC pulp and paper facilities greenhouse gas emissions were 62% less in 2006 than 1990, despite increased production volumes during that period. The reduction achieved by BC mills is ten times the 6% reduction in greenhouse gas emissions by 2012 committed to by Canada in ratifying the Kyoto Accord. As reported by the industry, the greenhouse gases that were not emitted by the BC pulp and paper industry in 2006 in comparison to 1990 levels are the equivalent of removing the emissions of over 600,000 vehicles.

The pulp and paper industry is a global leader in the use of combined heat and power (CHP) systems. These cogeneration systems produce electrical power and thermal energy from the same fuel. Yielding at least twice as much usable energy from the same amount of fuel as normal methods reduces the demand for fossil fuels, which in turn reduces greenhouse gas emissions.

Energy Self-sufficiency

An average pulp mill in BC consumes 300,000 MWH of power per year. However, the industry generates over 70% of its energy requirements from within the pulping process. In addition to satisfying their own needs, several mills in BC sell steam or electricity to the grid, for consumption by households and businesses in the province.

BC Hydro has the capacity to generate 11,000 MW and currently imports 12% of its energy requirements. BC's energy demand is expected to increase by 25-45% over the next 20 years, creating a significant opportunity for the BC pulp industry to supply the province with energy and thereby generate additional income to support operations and capital expenditures. The BC pulp sector is currently generating 850 MW for internal use and many mills in the province have achieved energy self-sufficiency. This type of self-sufficiency has a positive impact on the environment.