

BC Forest Industry Economic Impact Study

JANUARY 2015



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1. EXECUTIVE SUMMARY

The BC forest industry is a key contributor to the BC economy, and is important to the social fabric and economic well-being of many communities throughout the province. The industry provides employment and economic opportunities, generates government revenue and develops working relationships with First Nations communities. The industry supplies a broad range of products to domestic and international markets, and operates in an environment with complex forest ecosystems and species.

Estimate of Economic Impacts

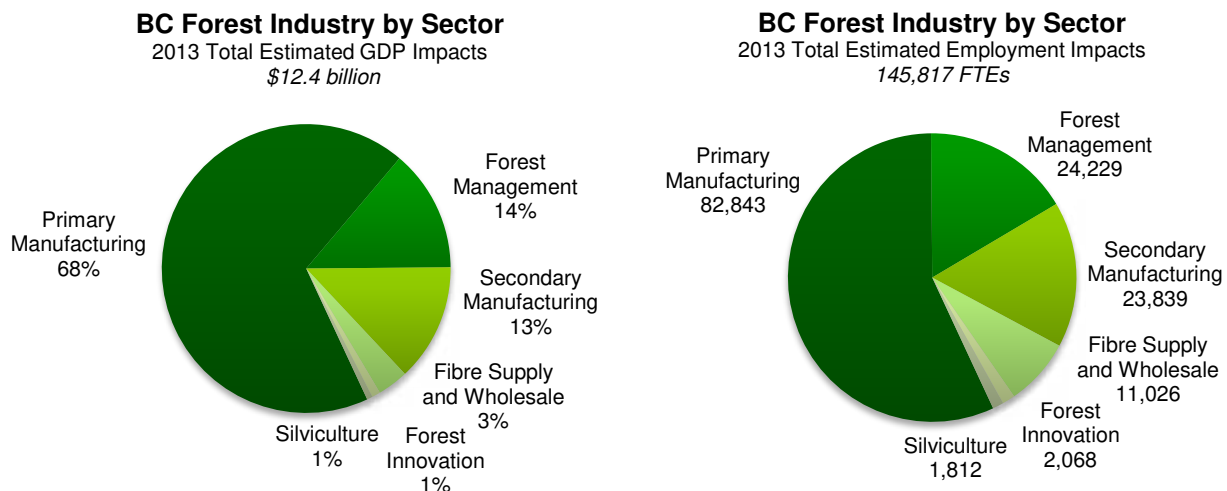
In 2013, total BC forest industry revenue was \$15.7 billion. Of this revenue, approximately 62 percent was generated in the interior region and 38 percent from the coast region.

The economic impacts for the industry in that year are estimated to have been:

- Total economic output was \$31.4 billion. Approximately 50 percent was direct output and 50 percent was indirect and induced output.
- Total GDP generated was \$12.4 billion. Direct GDP was approximately \$5.8 billion, which would equate to approximately 2.5 percent of provincial GDP.
- Total employment generated was 145,800 FTEs. Of this, almost 63,500 FTEs were created within the industry, while an additional 82,300 FTEs were created through linkages with other industries.
- Total revenue created for federal, provincial and municipal governments was almost \$2.5 billion. Of this, the federal government received an estimated \$934 million, the provincial government received an estimated \$1.4 billion and municipal governments received \$150 million.

The industry consists of six main sectors: primary manufacturing, forest management, secondary manufacturing, fibre supply and wholesale, forest innovation, and silviculture. Primary manufacturing is the largest sector within the industry, and accounted for 68 percent of the GDP and 57 percent of the employment generated by the industry in 2013.

Figure A: BC Forest Industry's Total Estimated GDP and Employment Impacts by Sector



Sector Summary

The following table summarises the estimated economic impacts of the BC forest industry by sector.

Table A: Summary of BC Forest Industry's Economic Impacts by Sector

(\$ millions)	Primary Manufacturing	Forest Management	Secondary Manufacturing	Fibre Supply and Wholesale	Forest Innovation	Silviculture	Total BC Forest Industry
Direct Impacts							
Output	\$10,793	\$2,223	\$2,036	\$463	\$124	\$100	\$15,740
GDP	\$3,586	\$1,054	\$763	\$282	\$73	\$53	\$5,812
Employment (FTEs)	24,172	14,744	13,043	8,783	1,372	1,424	63,538
Federal Tax	\$264	\$68	\$57	\$24	\$6	\$3.6	\$422
Provincial Tax	\$190	\$50	\$36	\$18	\$4	\$3.2	\$301
Municipal Tax	\$43	\$7.6	\$6	\$4.6	\$0.5	\$0.4	\$62
Indirect and Induced Impacts							
Output	\$11,390	\$1,767	\$2,004	\$314	\$94	\$66	\$15,637
GDP	\$4,886	\$647	\$873	\$148	\$44	\$26	\$6,624
Employment (FTEs)	58,671	9,485	10,796	2,243	696	388	82,279
Federal Tax	\$368	\$48	\$73	\$16	\$5	\$2.2	\$512
Provincial Tax	\$299	\$44	\$60	\$15	\$4	\$2	\$424
Municipal Tax	\$62	\$8.5	\$13	\$3.2	\$1	\$0.4	\$88
Total Impacts							
Output	\$22,183	\$3,990	\$4,041	\$777	\$219	\$167	\$31,377
GDP	\$8,472	\$1,701	\$1,636	\$430	\$117	\$79	\$12,436
Employment (FTEs)	82,843	24,229	23,839	11,026	2,068	1,812	145,817
Federal Tax	\$632	\$116	\$130	\$40	\$11	\$5.8	\$934
Provincial Tax	\$489	\$94	\$96	\$33	\$8	\$5.2	\$725
Other Provincial Revenue ¹							\$719
Municipal Tax	\$105	\$16.1	\$19	\$7.8	\$1.5	\$0.8	\$150

¹ Includes other payments to government such as stumpage, fee-in-lieu of domestic manufacturing, timber sales, rentals and licenses

KEY FEATURES OF THE INDUSTRY

In 2013, the forest industry supported approximately 6.3 percent of jobs in BC, or about one out of every 16 jobs. In 2013, the industry employed approximately 145,800 full-time equivalent jobs in the province, which translated into approximately one out of every sixteen jobs.²

The forest industry's primary manufacturing sector accounted for 24 percent of direct manufacturing employment in BC in 2013.³ In 2013, in terms of direct employment, approximately one out of every four manufacturing jobs in the province was related to forest products manufacturing. The ratio was higher in the interior region, where one out of every two jobs was related to forest products manufacturing. In the Cariboo region, approximately 83 percent of jobs were related to forest products manufacturing.⁴

In 2013, 40 percent of regional economies were forest dependent. The forest industry has an important economic and social role in many communities throughout the province. In 2013, more than 40 percent of BC's regional economies were estimated to be dependent on harvesting and processing of forest products.⁵

The forest industry is a world leader in sustainable forest management. BC has more land certified to internationally recognised sustainability standards than any other jurisdiction in the world. This certification has helped to differentiate products originating from BC forests as being environmentally sustainable products.

The forest industry includes First Nations participation. Since 2002, the Ministry of Forests, Lands and Natural Resource Operations has signed forest tenure agreements with 175 of the 203 First Nations in BC. These agreements provide \$324 million in resource revenue-sharing and access to 63.2 million cubic metres of timber.^{6,7}

The forest industry represents the largest manufacturing sector in BC. The forest industry represents the largest manufacturing sector in the province,⁸ and operates production facilities in every region. In 2013, there were approximately 250 primary and 1,525 secondary forest products manufacturing facilities located in all parts of the province.

The forest industry consists of more than 7,000 businesses in BC. In 2013, the industry was made up of approximately 7,306 businesses. The majority were small-sized businesses, with 83 percent employing less than 20 employees.

² BC Stats, "British Columbia Employment by Detailed Industry, Annual Averages" <http://www.bcstats.gov.bc.ca/StatisticsBySubject/LabourIncome/EmploymentUnemployment/LabourForceStatisticsAnnual.aspx> Accessed July 2014

³ Ibid

⁴ Ibid

⁵ BC Ministry of International Trade, "B.C. investing \$2.14 million to put wood first" News Release, June 10, 2014 http://www2.news.gov.bc.ca/news_releases_2013-2017/2014MIT0044-000793.htm, Accessed June 2014

⁶ British Columbia Newsroom, Office of the Premier, "B.C. invests \$8.4 million to develop markets for B.C. wood products" News Release, April 5, 2013

<http://www.newsroom.gov.bc.ca/2013/04/bc-invests-84-million-to-develop-markets-for-bc-wood-products.html>

⁷ First Nations in BC, "BC Assembly of First Nations" <http://fnbc.info/org/bc-assembly-first-nations>, Accessed September 2014 <https://www.aadnc-aandc.gc.ca/eng/1100100021009/1314809450456>

⁸ BC Stats, "British Columbia Employment by Detailed Industry, Annual Averages"

<http://www.bcstats.gov.bc.ca/StatisticsBySubject/LabourIncome/EmploymentUnemployment/LabourForceStatisticsAnnual.aspx> Accessed July 2014

Table B: BC Forest Industry's Businesses by Sector

Sector	Number of Businesses in 2013	Nature of Businesses and Employment
Primary Manufacturing	247	Mix of public and private companies Larger companies with more than 100 employees
Forest Management	4,737	Primarily small independent contractors, family-owned businesses Most have less than 20 employees Some larger companies with more than 100 employees
Secondary Manufacturing	1,525	Primarily small private companies, family-owned businesses Less than 20 employees
Fibre Supply and Wholesale	505	Primarily small companies Less than 20 employees
Silviculture	292	Primarily small companies, some seasonal and student employment Less than 20 employees
Total	7,306	

Sources: Statistics Canada, Ministry of Forests, Lands and Natural Resource Operations, *Random Lengths Big Book 2013*

The forest industry includes large BC-based companies that are among the top global forest companies. In 2013, there were 20 large forest companies operating in BC,⁹ with 16 of their corporate headquarters being located in the province. Seven of the 16 were ranked among the 50 largest public companies in the BC^{10,11} and five were ranked among the top 100 global forest companies.¹²

The forest industry is the largest producer of softwood lumber in Canada. BC produces more softwood lumber than any other province in Canada. In 2013, BC's production was 12.7 billion foot board measure, representing 52 percent of Canada's softwood lumber production. BC exported 53 percent of this production to the United States, 31 percent to China and 10 percent to Japan.¹³

The forest industry is the largest bioenergy producer in North America. Most pulp mills operating in BC now have power generation capacity. This helps to reduce energy costs and creates opportunities for sale of power, in excess of operating requirements, back to the grid. The use of wood residuals to generate energy minimises wood waste, and increases the economic yield from BC's forests. In 2013, BC produced more biomass energy than any other region in North America.¹⁴ As of 2012, BC also accounted for about 65 percent of Canada's wood pellet production and capacity.¹⁵

⁹ Ranked by number of BC employees in 2013

¹⁰ Ranked by worldwide sales

¹¹ Top 100 public companies in BC, *Business in Vancouver*, June 2014 –BC Public Company Ranking based on 2013 worldwide sales: West Fraser Timber Co Lt (7th), Canfor Corp (#8), International Forest Products Ltd (18th), Catalyst Paper Corporation (20th), Western Forest Products Inc (21st)

¹² PwC Global Forest, Paper & Packaging Industry Survey: 2013 edition – Survey of 2012 results

¹³ Industry Canada Trade Data Online, available here: <http://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>

¹⁴ Government of BC, "Forest Products Innovation", available here: http://www.britishcolumbia.ca/invest/documents/bcti_innovative,-sustainable-forestry-products-inn.aspx

¹⁵ Wood Pellet Association of Canada, "Production", available here: <http://www.pellet.org/production/production>

The forest industry is an important customer for BC Hydro and accounted for 12 percent or \$500 million of BC Hydro's domestic energy sales in 2013. In 2013, the industry accounted for an estimated 12 percent of BC Hydro's total domestic energy sales and 60 percent of its industrial sales. BC Hydro's energy sales to the industry were estimated to be close to \$500 million¹⁶. Sales to the pulp and paper sector accounted for approximately \$305 million, while sales to the wood products sector accounted for approximately \$115 million.¹⁷

The forest industry is a major customer for transportation industries. The industry is a major customer for the trucking, railway and shipping industries and creates economic benefits through its links in those industries. In total, an estimated 14 million metric tonnes of the industry's cargo shipped through BC ports in 2013¹⁸ to more than 25 countries. Of the 14 million metric tonnes shipped:

- 11.5 million metric tonnes shipped through Port Metro Vancouver terminals (representing 8.5 percent of the total volume of cargo shipped).¹⁹
- 2.5 million metric tonnes shipped through the Port Alberni, Nanaimo and Prince Rupert Port Authorities.^{20,21,22}
- 63 percent of the volume shipped in containers and 37 percent as break bulk cargo.²³

¹⁶ MNP estimate based on information provided in the BC Hydro Integrated Resource Plan, November 2013 and BC Hydro Annual Report 2013

¹⁷ Ibid

¹⁸ MNP estimate. See references below.

¹⁹ Port Metro Vancouver data, 2013 BC Origin Forest Product Exports by Cargo Type and Port Metro Vancouver Statistical Overview | 2013

²⁰ Scott McKenzie, Alberni Valley Times, "Port Lumber Exports Double", January 16, 2014, <http://www.avtimes.net/news/local-news/port-lumber-exports-double-1.791284>

²¹ Nanaimo Port Authority, "Nanaimo Port Authority Cargo Stats", http://deepsea.npa.ca/files/1314/1454/1476/2013_2010_NPA_Cargo_Statistics.pdf

²² "Dynamic Gateway. Growing Communities." 2013 Annual Report, Prince Rupert Port Authority

²³ Port Metro Vancouver data, 2013 BC Origin Forest Product Exports by Cargo Type

2. INTRODUCTION

BACKGROUND AND STUDY PURPOSE

The BC Lumber Trade Council, Council of Forest Industries, Coast Forest Products Association and Interior Lumber Manufacturers' Association engaged MNP LLP ("MNP") to carry out an economic impact study of the forest industry ("the Industry") in British Columbia ("BC").

The scope of the study included:

- An overview of the industry, including the development of a value chain to illustrate the linkages that exist between the Industry and other sectors of the economy.
- An assessment of the economic impacts of the industry and of each of the coast and interior forest regions, as well as the economic impacts of each of the industry's sectors. Included in the scope of the study were the following six sectors: primary manufacturing, forest management, secondary manufacturing, fibre supply and wholesale, forest innovation and silviculture.
- A comparison of the economic impacts generated by the industry with those produced by other industries in BC.
- A description of the social and economic benefits of the industry, highlighted through a series of case studies.

STUDY APPROACH

In preparing the study, MNP carried out the following activities:

- Conducted industry research through publicly available studies and reports.
- Gathered industry data and statistics from publicly available sources such as the BC Ministry of Forests, Lands and Natural Resource Operations, Statistics Canada and BC Stats, as well as other relevant industry associations.
- Utilised an economic impact model to estimate the economic impacts generated by the industry and its sectors.
- Developed case studies based on secondary research to demonstrate the broader social and economic benefits of the Industry.

REPORT LIMITATIONS

The report is provided for information purposes and is intended for general guidance only. It should not be regarded as a substitute for personalized, professional business or financial advice.

We have relied upon the completeness, accuracy and fair presentation of all information and data obtained from Industry and public sources, believed to be reliable. The accuracy and reliability of the findings and opinions expressed in the presentation are conditional upon the completeness, accuracy and fair presentation of the information underlying them. As a result, we caution readers not to rely upon any findings or opinions expressed as accurate or complete and disclaim any liability to any party who relies upon them for business or investment purposes.

Additionally, the findings and opinions expressed in the presentation constitute judgments as of the date of the presentation, and are subject to change without notice. MNP is under no obligation to advise of any change brought to its attention which would alter those findings or opinions.

3. PROFILE OF THE BC FOREST INDUSTRY

INDUSTRY OVERVIEW

The BC forest industry is a key contributor to the BC economy and is important to the social fabric and economic well-being of many communities throughout the province. Through its many activities, the industry provides employment and economic opportunities, generates government revenue and develops relationships with First Nations communities. In this section, we provide an overview of the industry and its activities.

Forest Regions and Fibre Supply

In total, roughly 55 million hectares of BC's total land base is considered productive forests. These forests provide a diverse and abundant supply of timber. Tree species from BC forests are primarily coniferous, and include douglas-fir, western hemlock, amabilis fir, western red cedar, lodgepole pine and interior spruce. The BC government issues timber tenures, allowing companies to harvest timber in exchange for stumpage fees and forest management responsibilities.²⁴

The industry is divided into two main regions, coast and interior. The coast region produces a wide variety of high-quality products from larger diameter logs and sought-after species, such as douglas-fir, hemlock and western red cedar. Fibre costs are high in the coast region, and the industry focuses on making products that maximize value from the forest resource.

The interior region typically produces structural building products from smaller diameter logs and species, such as spruce, pine and fir. The interior mills compete in global commodity markets, and focus on finding efficiencies, maximizing production and minimizing costs. The interior region produces more than 80 percent of BC's softwood lumber.²⁵

By 2016, the mountain pine beetle infestation in the interior region is projected to infect or destroy 58 percent of the merchantable lodgepole pine in the province. As a result of the infestation, there has been a 20 percent reduction in the annual allowable harvest from levels prior to the beetle infestation. A tightening timber supply is projected to lead to higher fibre costs as the industry's sawmill, panel, pulp and paper, wood pellet and bioenergy operations compete for a reduced supply of timber.²⁶

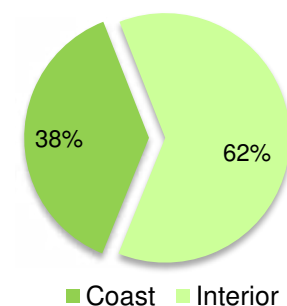
Sectors and Size of the Industry

BC forest industry operations can be categorised into six main sectors. These are:

- Primary manufacturing.
- Forest management.
- Secondary manufacturing.
- Fibre supply and wholesale.
- Forest innovation.
- Silviculture.

In aggregate, the total revenue from these sectors was estimated at approximately \$15.7 billion in 2013²⁷ (Table 1). Approximately 62 percent of this revenue is estimated to have been generated from the interior region and 38 percent from the coast region²⁸ (Figure 1). The largest sectors were primary manufacturing, forest management and secondary manufacturing, which together accounted for more than 95 percent of total industry revenue.

Figure 1: Regional Share of BC Forest Industry Revenue



²⁴ Trade and Invest in British Columbia, available here: <http://www.britishcolumbia.ca/invest/industry-sectors/forestry.aspx>

²⁵ Council of Forest Industries, Forest Facts, available here: <http://www.cofi.org/educationcareers/forest-education-links/forest-facts/>

²⁶ Girvan, J., Hall, M. Van Leeuwen, G., "B.C. Mountain Pine Beetle: Evolving Impacts and Opportunities" International Wood Markets, May 2012. Web April 2013

²⁷ MNP estimate. Please see Appendix B for a description of our calculations

²⁸ Ibid

Table 1. Industry Revenue by Sector

Industry Sector	Estimated Revenue (millions)
Primary manufacturing	\$10,793
Forest management	\$2,223
Secondary manufacturing	\$2,036
Fibre supply and wholesale	\$463
Forest innovation	\$124
Silviculture	\$101
Total	\$15,740

Sources: Statistics Canada, MNP estimates

Key Differentiators of the BC Forest Industry

The following are among the key factors that differentiate the BC forest industry from the forest industry in other regions:

- **Leader in Sustainability.** BC is recognised as a world leader in sustainable forest management. BC has more land certified to internationally recognised sustainability standards than any other jurisdiction in the world. This certification has helped to differentiate products from BC's forests as originating from environmentally sustainable sources.²⁹
- **Largest Producer of Softwood Lumber in Canada.** BC is the largest producer of softwood lumber in Canada. In 2013, BC's production was 12.7 billion foot board measure of softwood lumber, representing 52 percent of Canada's softwood lumber production. BC exported 53 percent of that production to the United States, 31 percent to China and 10 percent to Japan.³⁰
- **Export Market Potential.** BC's close proximity to markets in Asia is an advantage for the BC forest industry in terms of both trade relations and transit times. The BC forest industry has made efforts to diversify its markets, by exporting lumber to key markets in Asia, including China, South Korea and India. Export opportunities are being pursued in South Korea for residential and commercial construction, in India for doors, wooden furniture and architectural millwork, and in Japan for construction and value-added products. In addition, the Canada and European Union Comprehensive Economic and Trade Agreement is expected to remove tariffs on wood products and forestry-related services, thereby providing access to new market opportunities in the European Union.

LINKAGES WITH OTHER INDUSTRIES

Industry Inputs, Operations and Outputs

The BC forest industry generates economic impacts through its ties with other industries. (Direct economic impacts arise from the industry's core activities, while indirect and induced economic impacts arise from the linkages that exist with suppliers and other sectors and from the spending of employees).

As depicted in Figure 2, BC forest industry operations receive raw materials as input, add value to the raw materials through various processes and distribute finished products to customers. Among the related and ancillary sectors involved in BC forest industry operations are transportation, energy, environmental management, education and research, and professional services.

²⁹ Naturallywood.com, "Comparison of Selected Forest Certification Standards", available here:

<http://www.naturallywood.com/sites/default/files/Comparison-selected-forest-certification-summary.pdf>

³⁰ Industry Canada Trade Data Online, available here: <http://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>

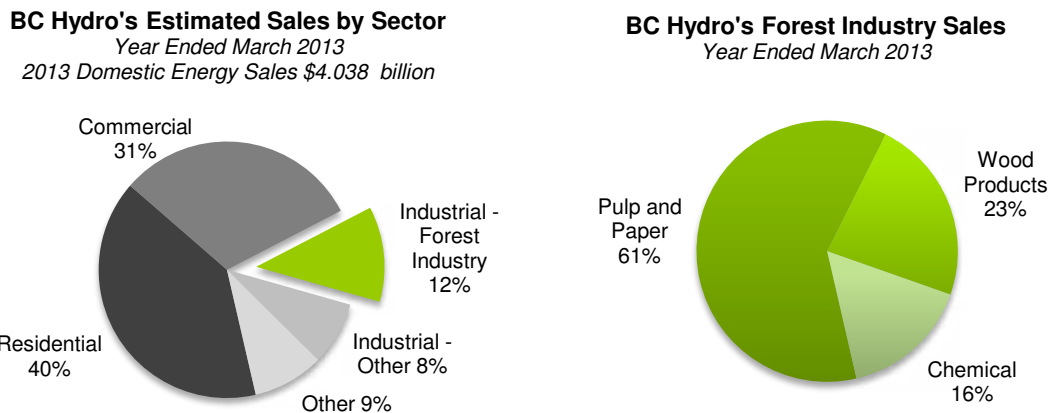
Figure 2: Relationships between Industry Inputs, Operations and Outputs



Utilities

Forest industry operations are some of BC Hydro's largest industrial customers. In 2013, for example, BC Hydro's energy sales to forest industry customers were estimated to be close to \$500 million.³¹ This represented approximately 12 percent of BC Hydro's total domestic energy sales (Figure 3) and 60 percent of industrial sales.³²

Figure 3: BC Hydro's Domestic Electricity Sales



Source: BC Hydro Integrated Resource Plan, November 2013 and BC Hydro Annual Report 2013

The pulp and paper and wood products manufacturers represented the majority of BC Hydro's forest industry sales, at 61 percent and 23 percent respectively. Catalyst Paper was BC Hydro's largest industrial customer in 2013, purchasing 19 percent of BC Hydro's industrial load, or five percent of BC Hydro's entire provincial load.³³

Transportation

The forest industry is heavily dependent on the transportation industry, and uses multiple modes of transportation. The industry relies on the efficient movement of goods to and from every region of the province, through roadways and railways (resource roads, highways and railroad networks), waterways (barging and towing) and shipping and handling (terminals, break bulk and container carriers).

Railcars are important to the movement of forest products in BC, both within the province and to destinations in the United States. In 2013, there were roughly 245,000 railcars that moved forest products to markets in Western Canada.³⁴ This represented approximately 14 percent of all single mode railcars loaded in Western Canada.

³¹ MNP estimates based on information provided in BC Hydro Integrated Resource Plan, November 2013 and BC Hydro Annual Report 2013

³² BC Hydro Integrated Resource Plan, November 2013 and BC Hydro Annual Report 2013

³³ "Communities & Impacts, Quick Facts" Catalyst Paper, May 2014 Accessed June 2014

³⁴ Statistics Canada Cansim Table 404-0002

In total, an estimated 14 million metric tonnes of BC forest industry cargo shipped through BC ports in 2013³⁵ to more than 25 countries. Of the 14 million metric tonnes shipped:

- 11.5 million metric tonnes shipped through Port Metro Vancouver terminals (representing 8.5 percent of the total volume of cargo shipped).³⁶
- 2.5 million metric tonnes shipped through the Port Alberni, Nanaimo and Prince Rupert Port Authorities.^{37,38,39}
- 63 percent of the volume shipped in containers and 37 percent as break bulk cargo.⁴⁰

In 2013, Port Metro Vancouver terminals shipped approximately 560,035 twenty-foot equivalent units (TEUs) of BC forest products.⁴¹ This represented 22 percent of all container shipments leaving the Port in 2013. Forest product container traffic was 22 percent of total laden traffic and 50 percent of all laden export containers in 2013.⁴²

An additional 68,502 TEUs of BC forest products shipped through the Prince Rupert Port Authority, which represented almost 13 percent of total container shipments from that port authority.⁴³

Figure 4 provides a breakdown of the types of BC forest products shipped through Port Metro Vancouver terminals in 2013. Lumber and pulp and paper products made up 70 percent of the industry's shipment.

Figure 4: Port Metro Vancouver BC Forest Products Shipments (2013)



Source: Port Metro Vancouver 2013 BC Origin Forest Product Exports by Cargo Type

³⁵ MNP estimate. See references below.

³⁶ Port Metro Vancouver data, 2013 BC Origin Forest Product Exports by Cargo Type and Port Metro Vancouver Statistical Overview | 2013

³⁷ Scott McKenzie, Alberni Valley Times, "Port Lumber Exports Double", January 16, 2014, <http://www.avtimes.net/news/local-news/port-lumber-exports-double-1.791284>

³⁸ Nanaimo Port Authority, "Nanaimo Port Authority Cargo Stats", http://deepsea.npa.ca/files/1314/1454/1476/2013_2010_NPA_Cargo_Statistics.pdf

³⁹ Dynamic Gateway. Growing Communities." 2013 Annual Report, Prince Rupert Port Authority

⁴⁰ Port Metro Vancouver data, 2013 BC Origin Forest Product Exports by Cargo Type

⁴¹ Port Metro Vancouver, BC Forest Product Exports, 2013 Statistics. Statistics were converted to TEUs by PMV

⁴² Provided by Port Metro Vancouver

⁴³ "Dynamic Gateway. Growing Communities." 2013 Annual Report, Prince Rupert Port Authority

VALUE CHAIN

The value chain (Figure 5) provides a graphical illustration of the industry's primary activities and linkages that exist with other industries and stakeholders with which it interacts. The value chain highlights both the diversity and complexity of the BC forest industry's activities.

Figure 5: BC Forest Industry Value Chain



4. ECONOMIC IMPACT ANALYSIS

ECONOMIC IMPACT ANALYSIS METHODOLOGY

MNP's estimates of economic impacts have been developed using BC Stats input-output model and related economic multipliers. An input-output model is based on statistical information about the flow of goods and services among various industries, and is normally used "to simulate the economic impact on the business sector of an expenditure on a given basket of goods and services or the output of one of several industries."⁴⁴

Input-output modeling is a widely-used and widely-accepted approach, making it recognisable by many different stakeholders and audiences. The structure of the approach also facilitates comparisons between reported results for different projects and facilities.

Economic impacts are generally viewed as being restricted to quantitative, well-established measures of economic activity. The most commonly used of these measures are output, GDP, employment and government tax revenue:

- **Output** is the total gross value of goods and services produced by a given company or industry measured by the price paid to the producer. This is the broadest measure of economic activity.
- **Gross Domestic Product (GDP)** or value-added refers to the additional value of a good or service over the cost of inputs used to produce it from the previous stage of production. GDP is the unduplicated total value of goods and services produced. GDP is a more meaningful measure of economic impact than output, as it avoids double counting during each round of production.
- **Government Tax Revenue** arise from personal income taxes, corporate income taxes, consumption taxes (e.g. PST and GST) and indirect taxes on production.
- **Employment** is the number of additional jobs created. Employment is measured in terms of full-time equivalents (FTEs).

Economic impacts may be estimated at the direct, indirect and induced levels.

- **Direct impacts** are changes that occur in "front-end" businesses that would initially receive expenditures and operating revenue as a direct consequence of the operations and activities of an industry.
- **Indirect impacts** are changes in the activity of suppliers to front-end businesses. Indirect impacts include the spending that suppliers make when purchasing goods and services.
- **Induced impacts** arise from shifts in spending on goods and services as a consequence of changes to the payroll of the directly and indirectly affected businesses. In the case of the BC forest industry, induced impacts reflect the additional spending by the employees of the BC forest industry and by the BC forest industry's suppliers.

A detailed description of our methodology and assumptions is provided in Appendix B.

⁴⁴ Statistics Canada. (2013, April). *Input-Output Model Simulations (Interprovincial Model)*. Retrieved from <http://www5.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=15F0009X>

ESTIMATED ECONOMIC IMPACTS OF THE BC FOREST INDUSTRY

The economic impacts that are estimated that have been generated within BC by the forest industry in 2013 are:

- Total economic output of \$31.4 billion.
- Total GDP impact of \$12.4 billion. Direct GDP was approximately \$5.8 billion, which would equate to approximately 2.5 percent of provincial GDP.
- Total employment generated of approximately 145,800 FTEs. Of this, the industry directly employed roughly 63,500 FTEs and supported an additional 82,300 FTEs in other sectors.
- Total revenue generated for federal, provincial and municipal governments of almost \$2.5 billion. Of this, the federal, provincial and municipal governments received \$934 million, \$1.4 billion and \$150 million respectively.

The economic impacts generated by the forest industry within BC in 2013 are shown in Table 2.

Table 2. Total Estimated Economic Impacts of the BC Forest Industry in BC in 2013

Economic Impacts BC Forest Industry in 2013						
	Output (millions)	GDP (millions)	Employment (FTEs)	Federal Tax (millions)	Provincial Tax (millions)	Municipal Tax (millions)
Direct	\$15,740	\$5,812	63,538	\$422	\$301	\$62
Indirect and Induced	\$15,637	\$6,624	82,279	\$512	\$424	\$88
Other Government Revenue ⁴⁵					\$719	
Total	\$31,377	\$12,436	145,817	\$934	\$1,444	\$150

Additional Forest-Related Revenue for the Provincial Government

The Government of BC receives revenue from the forest industry in several ways. The economic impact model includes taxes such as excise, property and income taxes, and generated total direct, indirect, and induced provincial tax revenue of approximately \$725 million in 2013. In addition to property, excise and income taxes, the provincial government also received other forest-related revenue, including stumpage, fee-in-lieu of domestic manufacturing, timber sales, rentals and licences, and export fees. These additional sources of government revenue are estimated to have been roughly \$719 million in 2013/14, which would put the total provincial revenue from forestry-related sources at approximately \$1.4 billion. The estimated impacts of provincial government tax revenue from forestry-related sources is summarised in Table 3.

⁴⁵ Includes other payments to government including stumpage, fee-in-lieu of domestic manufacturing, export fees, rentals and licenses

Table 3. Estimated BC Government Revenue from the Forest Industry, 2013/14⁴⁶

Other Provincial Revenue	Interior Revenue (millions)	Coast Revenue (millions)	Total Revenue (millions)
Tenures (including stumpage and harvesting rents and fees)	\$367	\$30	\$397
BC Timber Sales	\$150	\$80	\$230
Timber Export Fees	\$1	\$15	\$16
Logging Tax	-	-	\$24
Softwood Lumber Export Tax	-	-	\$24
Other revenue (includes recoveries, allowance for doubtful accounts, penalties, etc.)	-	-	\$28
Total⁴⁷			\$719
Forest-related income, property and excise taxes ⁴⁸	\$455	\$270	\$725
Total forest related revenue			\$1,444

Source: BC Ministry of Forests, Lands and Natural Resource Operations, 2013/14 Revenues (Unaudited,) as of September 2014

Forest Dependent Regions

Since the 1980s, overall employment in the BC forest industry has declined, while the province's economy has grown and diversified. Although provincial dependence on the industry has decreased, many small and rural communities are still heavily dependent on the industry. More than 40 percent of BC's regional economies are estimated to be dependent on harvesting and processing of forest products.⁴⁹ The local economies of these communities, many of which are in the interior region, are vulnerable to downturns in forest products markets and the impacts of the mountain pine beetle infestation.

Industry Employment

In 2013, the direct FTEs created by the forest industry accounted for approximately 2.5 percent of BC's total direct employment.⁵⁰

In 2013, the industry was BC's largest manufacturing sector, and operated production facilities in every region of the province. In 2013, the industry's primary manufacturing sector accounted for 24 percent of total manufacturing employment in BC.⁵¹ In other words, in terms of direct employment, approximately one out of every four manufacturing jobs in the province was related to forest products manufacturing. The ratio was higher in the interior region, where one out of every two jobs was related to forest products

⁴⁶ Total revenue reported in this table, including the allocation between coast and interior, were obtained from the Ministry of Forests, Lands and Natural Resource Operations and the 2014 British Columbia Office of the Comptroller General Public Accounts 2014, available here: <http://www.fin.gov.bc.ca/pubs.htm>

⁴⁷ The total revenue of \$719 million is the amount reported in the 2014 British Columbia Office of the Comptroller General Public Accounts 2013/14. The forest revenue provided by the Ministry of Forests, Lands and Natural Resource Operations (FLNRO) as of September, 2014 for 2013/14 was \$669 million. An additional \$24 million of logging tax is a corporate tax administered by the Ministry of Finance. The balance was included in the table under "Other revenue"

⁴⁸ These values are estimates for the 2013 calendar year and do not necessarily align with the 2013/14 fiscal year of the Government of BC

⁴⁹ BC Ministry of International Trade, "B.C. investing \$2.14 million to put wood first" News Release, June 10, 2014 http://www2.news.gov.bc.ca/news_releases_2013-2017/2014MIT0044-000793.htm, Accessed June 2014

⁵⁰ BC Stats, "British Columbia Employment by Detailed Industry, Annual Averages" <http://www.bcstats.gov.bc.ca/StatisticsBySubject/LabourIncome/EmploymentUnemployment/LabourForceStatisticsAnnual.aspx> Accessed July 2014

⁵¹ Ibid

manufacturing. Of particular note was the Cariboo region, in which approximately 83 percent of jobs were related to forest products manufacturing.⁵²

Table 4 shows the BC forest industry's estimated percent of regional employment, and regional manufacturing employment on a forest/economic region basis, in 2013.⁵³

Table 4. BC Forest Industry's Share of Employment by Forest and Economic Region

Forest/Economic Regions	Total Regional Employment (Percent)	Total Regional Manufacturing Employment (Percent)
Coast Region	1.6	15.6
North Coast/Nechako	9.3	45
Vancouver Island/Coast	2.6	31
Mainland/Southwest	1.1	12
Interior Region	6.1	51
Cariboo	14.0	83
Thompson/Okanagan	5.0	41
Kootenay	3.3	30
Northeast	2.0	Not Provided (<1,500 employees)
BC Total	2.5	24

Source: BC Stats: Employment Unemployment Rate by Detailed Industry 2013

Forest Companies with Corporate Headquarters in BC

There are a number of large forest companies, both public and private, that have corporate headquarters in BC. Moreover, the majority of these companies and the majority have operated facilities in BC for more than 50 years. Table 5 lists the 16 largest BC-based forest companies ranked by the number of BC employees. In 2013, BC employees represented 70 percent of the total employment of these companies. As well, the BC employees of these companies accounted for 28 percent of the BC forest industry's direct employment.

Of the 16 largest BC-based forest companies, seven were ranked among the 50 largest public companies in the province,^{54,55} and five of the seven companies were among the top 100 global forest companies.⁵⁶

⁵² BC Stats, "British Columbia Employment by Detailed Industry, Annual Averages"
<http://www.bcstats.gov.bc.ca/StatisticsBySubject/LabourIncome/EmploymentUnemployment/LabourForceStatisticsAnnual.aspx>
Accessed July 2014

⁵³ Ibid

⁵⁴ Ranked by worldwide sales

⁵⁵ Top 100 public companies in BC, Business in Vancouver, June 2014 –BC Public Company Ranking based on 2013 worldwide sales: West Fraser Timber Co Lt (7th), Canfor Corp (#8), International Forest Products Ltd (18th), Catalyst Paper Corporation (20th), Western Forest Products Inc (21st)

⁵⁶ PWC Global Forest, Paper & Packaging Industry Survey: 2013 edition – Survey of 2012 results

Table 5. Largest BC-Based Forest Companies in 2013

Company	BC Employees
Canfor Corporation	4,114
West Fraser Timber Co Ltd	3,218
Tolko Industries Ltd	2,400
Western Forest Products Inc	2,004
Catalyst Paper Corporation	1,578
Interfor Corporation	981
Teal Jones Group	970
Conifex Timber Inc	550
Richmond Plywood Corporation	446
Gorman Bros Lumber Ltd	355
Nanaimo Forest Products Ltd	300
Ainsworth Engineered Canada LP	235
Brink Forest Products Ltd	175
Coulson Group of Companies	150
TimberWest Forest Corporation	90
West Chilcotin Forest Products Ltd	47
Total	17,613

Source: Biggest Forestry Companies in BC in 2013, Business in Vancouver

ESTIMATED ECONOMIC IMPACTS BY SECTOR

The following sections report on the estimated economic impacts of the industry by sector.

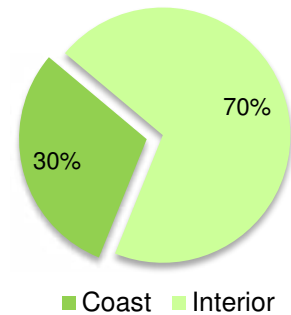
Primary Manufacturing

Highlights

- *Estimated revenue of \$10.8 billion*
- *Employment created 82,843 FTEs*
- *247 businesses*
- *Largest manufacturing sector in the province*
- *Largest producer of softwood lumber products in Canada*

The primary manufacturing sector is the forest industry's largest sector, and continues to dominate the industry's activities. Total sector revenue is estimated to have been \$10.8 billion in 2013⁵⁷. Of this revenue, it is estimated that approximately 70 percent was generated from the interior region and 30 percent from the coast region⁵⁸ (Figure 6).

Figure 6: Regional Share of Primary Manufacturing Sector Revenue



The revenue generated from the sale of BC's forest products accounted for more than 27 percent of all manufacturing sales in BC.⁵⁹ Forest products manufacturing was also the largest manufacturing industry in BC in 2013, followed by the food processing industry.⁶⁰

The sector produces a broad range of products, ranging from commodity products, which are heavily influenced by global pricing and demand, to specialty and niche products, which are highly sought after for their unique characteristics and quality of fibre. Commodity products, such as dimensional lumber, pulp, paper and panels, make up the majority of forest products manufactured in BC.

Primary manufacturing facilities convert whole logs into a number of lumber products or panels for structural, industrial and appearance applications, as well as for remanufacturing into value-added components. Wood residuals, such as chips and hog fuel, are also produced as by-products of the primary manufacturing process, and are consumed by pulp and bioenergy operations. Primary manufacturers process about 91 percent of all logs harvested in the province in 2013.⁶¹

As shown in Table 6, primary manufacturing of wood and pulp products accounted for approximately 30 percent of total BC exports in 2013. Other forest products collectively made up an additional four percent of BC exports in 2013.



Table 6. Value of BC's Exports of Forest Products, 2013⁶²

Forest Products	Value (\$ millions)	Percent of BC Forest Product Exports	Percent of Total BC Exports
Primary Manufacturing of Wood and Pulp Products	\$10,249 (52 percent was softwood lumber) ⁶³	88.5%	30.1%
Whole logs	\$802	6.9%	2.4%
Secondary Manufacturing	\$536	4.6%	1.6%
Total	\$11,587	100.0%	34.1%

⁵⁷ MNP estimate. Please see Appendix B for a description of our calculations

⁵⁸ Ibid

⁵⁹ Statistics Canada. Table 304-0015 - Manufacturing sales, by North American Industry Classification System (NAICS) and province, annual (dollars)

⁶⁰ Ibid

⁶¹ MNP estimate based on a comparison of the volume of log exports from BC Stats, and the total harvest from the Government of BC's Harvest Billing System

⁶² Industry Canada Trade Database Online and BC Stats

⁶³ The softwood lumber export share is calculated by dividing the total value of softwood lumber exports according to BC Statistics by the total value of primary manufacturing exports according to Industry Canada

Primary manufacturing is capital intensive. As a result, processing facilities tend to be operated by large companies. The most recent list of processing facilities in BC was compiled by the Ministry of Forests, Lands and Natural Resource Operations in 2011, and was updated in 2014. It estimated that there were 247 primary forest products manufacturing facilities in BC.⁶⁴ Of those facilities, approximately 30 percent had 50 or more employees.⁶⁵ The breakdown of primary manufacturing facilities by type is summarised in Table 7.

Table 7. Estimated Primary Forest Products Manufacturing Facilities in BC

Type of Mill	Number in BC
Lumber	132
Veneer and OSB	16
Pulp and Paper Mills	18
Chip Mills	10
Shake and Shingle Mills	26
Wood Treating Plants	12
Other Mills	33
Total	247

Sources: Ministry of Forests, Lands and Natural Resource Operations. 2013 *Random Lengths Big Book*, MNP estimates

As shown in Table 8, the economic impacts of the primary forest products manufacturing sector in 2013 are estimated to have been:

- Total economic output of \$22.2 billion.
- Total GDP impacts of \$8.5 billion. Direct GDP was approximately \$3.6 billion, which would equate to approximately 1.6 percent of provincial GDP.
- Total employment generated of 82,843 FTEs. Of this, the sector employed an estimated 24,172 FTEs and supported an additional 58,671 FTEs in other sectors.
- Total revenue created for federal, provincial and municipal governments of approximately \$1.2 billion. Of this, the federal, provincial and municipal governments received an estimated \$632 million, \$490 million and \$105 million respectively.

Table 8. Economic Impacts of the Primary Manufacturing Sector

Primary Manufacturing						
	Output (thousands)	GDP (thousands)	Employment (FTEs)	Federal Tax (thousands)	Provincial Tax (thousands)	Municipal Tax (thousands)
Direct	\$10,793,117	\$3,586,689	24,172	\$263,898	\$190,321	\$43,132
Indirect and Induced	\$11,390,267	\$4,885,650	58,671	\$368,226	\$299,283	\$61,974
Total	\$22,183,384	\$8,472,339	82,843	\$632,123	\$489,605	\$105,107

⁶⁴ The number of mills was retrieved from the Ministry of Forests, Lands and Natural Resource Operations, "Major Primary Timber Processing Facilities in BC, 2011" report

⁶⁵ Statistics Canada Cansim Table 551-0005. Note that this only includes companies with a determinate number of employees. The numbers of employees does not represent a full-time equivalent, but could be all full-time, all part-time, or any combination

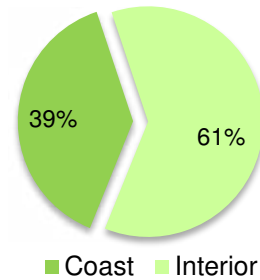
Forest Management

Highlights

- *Estimated revenue of \$2.2 billion*
- *Employment created 24,000 FTEs*
- *4,737 businesses*
- *BC is a global leader in sustainable forest management*
- *53 million hectares certified to sustainable forest management standards*

The forest management sector is comprised of companies that provide services to support sustainable forest management, land ownership and tenure arrangements, forest inventory and valuations, planning and protection activities, road construction, maintenance and deactivation and timber harvesting.

Figure 7: Regional Share of Forest Management Sector Revenue



Total sector revenue is estimated to have been \$2.2 billion in 2013. Of this revenue, approximately 61 percent is estimated to have been generated in the interior region and 39 percent from the coast region (Figure 7).

BC has approximately 55 million hectares of productive forests, with 68 percent of forests being in the interior region and 32 percent in the coast region.⁶⁶ BC is unique among the world's timber producers in that 95 percent of BC's forestland is publicly-owned and is subject to provincial forest management regulations.



BC is an international leader in sustainable forest management and third-party certification to sustainable forest management standards. There are 53 million hectares of forestland in BC that are certified to one of three independent and internationally recognised sustainable forest management standards.⁶⁷

Forest management regulations and sustainable forest management certifications require forest tenure holders to conserve soils, reforest logged areas. Tenure holders are also required to protect riparian areas,

fish and fish habitats, watersheds, biodiversity and wildlife. Specific requirements for the construction, maintenance and deactivation of forest roads are also provided.

Less than one percent of BC's forests are logged each year. In 2013, about 70.9 million cubic metres of timber was harvested in BC, with 71 percent being harvested from the interior region and 29 percent from the coast region.⁶⁸ Historically, about 91 percent of volume is harvested from Crown land. The remaining 9 percent is harvested from private land, primarily from forests on Vancouver Island.⁶⁹

At the end of 2013, there were approximately 4,737 companies, directly engaged in forest management, most of which were small, independent contractors.⁷⁰ It is estimated that 97 percent of forest management companies had less than 50 employees and that 90 percent had less than 20 employees.⁷¹ The largest share of forest management companies included logging contractors and direct support service providers. The companies with more than 50 employees tended to be integrated forest companies that had operations in forest management, primary manufacturing, wholesaling or other industry sectors.

As shown in Table 9 the economic impacts of the forest management sector in 2013 are estimated to have been:

- Total economic output of \$4 billion.

⁶⁶ Council of Forest Industries, Forest Facts, available here: <http://www.cofi.org/educationcareers/forest-education-links/forest-facts/>

⁶⁷ Naturallywood.com, "Comparison of Selected Forest Certification Standards", available here: <http://www.naturallywood.com/sites/default/files/Comparison-selected-forest-certification-standards-summary.pdf>

⁶⁸ Alex Barnes, "2013 Economic State of the BC Forest Sector." August 2014, available here: <http://www.for.gov.bc.ca/ftp/het/external/publish/web/economic-state/Economic-State-of-BC-Forest-Sector-2013.pdf>

⁶⁹ National Forestry Database, based on average from 2008-2012, available here: http://nfdp.ccfm.org/index_e.php

⁷⁰ Statistics Canada Cansim Table 551-0005 for NAICS codes 113311, 113312, and 115310. This includes companies that do not report payroll information but may hire contractors, family members, or be sole-practitioners. It excludes support services that are classified as silviculture firms

⁷¹ Statistics Canada Cansim Table 551-0005. Note that this only includes companies with a determinate number of employees. The numbers of employees does not represent a full-time equivalent, but could be all full-time, all part-time, or any combination

- Total GDP impacts of \$1.7 billion. Direct GDP was approximately \$1.1 billion.
- Total employment generated of 24,229 FTEs. Of this, the sector employed an estimated 14,744 FTEs and supported an additional 9,485 FTEs in other sectors.
- Total revenue created for federal, provincial and municipal governments of approximately \$226 million. Of this, the federal, provincial and municipal governments received an estimated \$116 million, \$94 million and \$16 million respectively.

Table 9. Economic Impact of the Forest Management Sector

Forest Management						
	Output (thousands)	GDP (thousands)	Employment (FTEs)	Federal Tax (thousands)	Provincial Tax (thousands)	Municipal Tax (thousands)
Direct	\$2,223,444	\$1,054,128	14,744	\$67,997	\$50,032	\$7,616
Indirect and Induced	\$1,767,100	\$647,444	9,485	\$48,111	\$44,001	\$8,507
Total	\$3,990,544	\$1,701,571	24,229	\$116,107	\$94,032	\$16,123

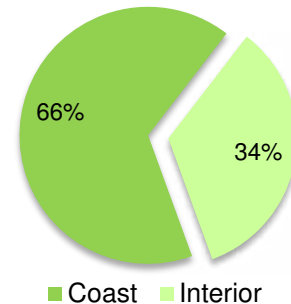
Secondary Manufacturing

Highlights

- *Estimated revenue of \$2.0 billion*
- *Employment created 23,800 FTEs*
- *1,525 businesses*
- *Comparable in revenue and size to the forest management sector*

Not all primary manufacturing products are shipped directly to market. Some are sent to secondary manufacturers⁷² that produce semi-finished and finished products and components. These products include engineered wood, mouldings, window and door frames, cabinets, furniture components and pallets. Log homes are also included as part of this sector.

Figure 8: Regional Share of Secondary Manufacturing Sector Revenue



Total sector revenue is estimated to have been \$2 billion in 2013. Of this revenue, approximately 66 percent was generated from the coast region and 34 percent from the interior region (Figure 8).

There were approximately 1,525 secondary manufacturing businesses in BC at the end of 2013.⁷³ Secondary manufacturers are often small businesses that operate with specialised equipment, and which manufacture specialty and niche products. It is estimated that almost 80 percent of the secondary manufacturing businesses in BC had less than 20 employees, and only seven percent had more than 50 employees.⁷⁴

The economic impacts of the secondary manufacturing sector in BC are comparable to those of the forest management sector. As shown in Table 10 the economic impacts of the sector in 2013 are estimated to have been:

- Total economic output of \$4 billion.
- Total GDP impacts of \$1.6 billion. Direct GDP was approximately \$763 million.
- Total employment generated of 23,839 FTEs. Of this, the sector employed an estimated 13,043 FTEs and supported an additional 10,796 FTEs in other sectors.
- Total revenue created for federal, provincial and municipal governments was approximately \$244 million. Of this, the federal, provincial and municipal governments received an estimated \$130 million, \$96 million and \$19 million respectively.

Table 10. Economic Impacts of the Secondary Manufacturing Sector

Secondary Manufacturing						
	Output (thousands)	GDP (thousands)	Employment (FTEs)	Federal Tax (thousands)	Provincial Tax (thousands)	Municipal Tax (thousands)
Direct	\$2,036,420	\$762,894	13,043	\$57,038	\$35,924	\$6,192
Indirect and Induced	\$2,004,256	\$873,319	10,796	\$72,748	\$59,722	\$12,681
Total	\$4,040,676	\$1,636,213	23,839	\$129,786	\$95,646	\$18,873

⁷² This report defines secondary manufacturing as other wood product manufacturing [NAICS 3222], converted paper product manufacturing [NAICS 3219], wood kitchen cabinet and counter top manufacturing [NAICS 33711] and other wood household furniture manufacturing [NAICS 337123]

⁷³ Statistics Canada Cansim Table 551-0005 for NAICS codes 3222, 3219, 33711, and 337123. This includes companies that do not report payroll information but may hire contractors, family members, or be sole-practitioners

⁷⁴ Statistics Canada Cansim Table 551-0005. Note that this only includes companies with a determinate number of employees. The numbers of employees does not represent a full-time equivalent, but could be all full-time, all part-time, or any combination

Fibre Supply and Wholesale

Highlights

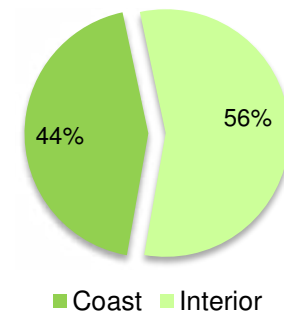
- *Estimated revenue of \$463 million*
- *Employment created 11,026 FTEs*
- *505 businesses*

The fibre supply and wholesale sector is comprised of wholesalers and brokers that trade logs, wood chips and wood products both domestically and internationally. In addition, there are some integrated forest companies that perform these activities in-house and use their own networks of suppliers and customers. These companies are excluded from the fibre supply and wholesale sector totals, as their contributions are captured as part of the primary and secondary manufacturing sectors.

In 2013, there were approximately 493 lumber, plywood and millwork wholesalers operating in BC.⁷⁵ In addition, there were approximately 12 log brokers, which generally focus on coastal operations.⁷⁶ Lumber wholesalers and log brokers tend to be small businesses that provide services to smaller forest operations. It is estimated that over 95 percent of wholesalers and brokers had less than 50 employees in 2013.

Total sector revenue is estimated to have been \$463 million in 2013. Of this revenue, approximately 56 percent was generated from the interior region and 44 percent from the coast region (Figure 9).

Figure 9: Regional Share of Fibre Supply and Wholesale Sector Revenue



As shown in Table 11 the economic impacts of the fibre supply and wholesale sector in 2013 are estimated to have been:

- Total economic output of \$777 million.
- Total GDP impacts of \$430 million. Direct GDP was approximately \$282 million.
- Total employment generated of 11,026 FTEs. Of this, the sector employed an estimated 8,783 FTEs and supported an additional 2,243 FTEs in other sectors.
- Total revenue created for federal, provincial and municipal governments of approximately \$81 million. Of this, the federal, provincial and municipal governments received an estimated \$40 million, \$33 million and \$8 million respectively.

Table 11. Economic Impacts of the Fibre Supply and Wholesale Sector

Fibre Supply and Wholesale						
	Output (thousands)	GDP (thousands)	Employment (FTEs)	Federal Tax (thousands)	Provincial Tax (thousands)	Municipal Tax (thousands)
Direct	\$462,488	\$282,118	8,783	\$24,049	\$18,037	\$4,625
Indirect and Induced	\$314,492	\$147,996	2,243	\$16,187	\$14,800	\$3,237
Total	\$776,980	\$430,114	11,026	\$40,236	\$32,837	\$7,862

⁷⁵ Statistics Canada Cansim Table 551-0005 for NAICS code 416320. This includes companies that do not report payroll information but may hire contractors, family members, or be sole-practitioners

⁷⁶ Federation of BC Woodlots Log & Lumber Buyer Database, 2009, available here: www.woodlot.bc.ca/PDF/Log-Buyer-Database-Version-3.xls

Forest Innovation

Highlights

- *Estimated revenue of \$124 million*
- *Supports 2,000 FTEs*
- *Largest biomass producer in Canada*
- *Responsible for 65 percent of Canada's wood pellet production*

The forest innovation sector is focused on finding ways of extracting maximum value from the forest resource. This generally includes research into new and more effective silviculture methods, forest management and next generation manufactured products.

The Forest Products Association of Canada has partnered with FPInnovations and Natural Resources Canada to create a blueprint to help guide the Canadian forest industry toward innovation and new forest products. They have identified a

potential global bio-based market of \$200 billion, and a potential biochemical market of \$62 billion.⁷⁷

Among the next generation products are:

- **Engineered wood products.** These products increase the value of lower grades of fibre, such as coastal utility grade hemlock and interior pine beetle kill, that can be used to produce composite lumber products and laminated timbers.
- **New building techniques and solutions** that explore new ways of substituting non-renewable construction materials with forest products which are engineered to maximise the structural safety, comfort and energy efficiency of building systems.
- **Biochemicals** that are developed from converting wood chips, lignin, and pulp mill by-products into a wide range of product, including moisture resistant packaging, medical gowns, tires, industrial chemicals and resins.
- **Bioenergy** that is generated from forest biomass. Wood biomass-based energy products can be derived from solid wood, bark and other wood residues, wood chips, lignin, and sludge from effluent ponds. These are refined to produce energy products, including wood pellets, electricity, ethanol, and bio-diesel.



The forest innovation sector is working with waste streams from harvesting, primary and secondary manufacturing. Product development from the sector's waste streams allows more value to be extracted from the forest resource. Advances such as parallam, nano-cystalline cellulose particle technology, and cellulose-based energy products have foundations in BC-based research.

BC enjoys an extensive and globally-recognised forest product research network. Among the research institutions and funding organisations are:

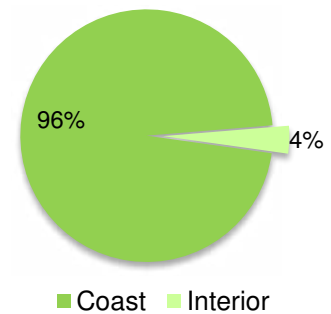
- **BC's universities.** The University of British Columbia (UBC), University of Northern BC (UNBC), Simon Fraser University (SFU), University of Victoria (UVic) and Vancouver Island University (VIU) all have dedicated forest research centres, groups or initiatives. Examples include the Enhanced Forestry Laboratory (UNBC), Centre for Forest Biology (UVic), and the Forest Sciences Centre (UBC).
- **Research organisations.** The Pacific Forestry Centre, FPInnovations, BC Bioenergy Network all have direct research programs or grants that fund BC's forest innovation activities.
- **Funding sources.** Sources of funding include Investments in Forest Industry Transformation Program (IFIT), Western Economic Diversification Canada, Sustainable Development Technology Canada (SDTC), Northern Development Initiative Trust, BC Bioenergy Network, Forest Innovation Investment, the provincial and federal governments and industry sources.

It is estimated that these organisations received over \$124 million in funding for forest research in 2013 (Table 12). Approximately 96 percent of this funding was allocated to large metropolitan areas in the coast region where most research centres are located (Figure 10).

⁷⁷ Forest Products Association of Canada and FPInnovations. "The New Face of the Canadian Forest Industry." Available here: <http://www.fpac.ca/publications/BIOPATHWAYS%2011%20web.pdf>

Table 12. Summary of Forest Research Funding in BC, 2013⁷⁸

Funding Source/Organisation	Estimated Value in 2013
UBC Faculty of Forestry	\$11,206,291
FPIInnovations	\$89,736,000
Forest Innovation Investment	\$9,021,000
Investments in Forest Industry Transformation Program	\$3,400,000
Northern Development Initiative Trust	\$993,570
BC Bioenergy Network	\$1,395,833
UVic Centre on Forest Biology	\$500,000
BC Government	\$8,000,000
Total	\$124,252,694

Figure 10: Regional Share of Forest Innovation Research Funding

As shown in Table 13 the economic impacts of forest innovation research in 2013 are estimated to have been:

- Total economic output of \$219 million.
- Total GDP impacts of \$117 million. Direct GDP was approximately \$73 million.
- Total employment generated of 2,068 FTEs. Of this, the sector employed an estimated 1,372 FTEs and supported an additional 696 FTEs in other sectors.
- Total revenue created for federal, provincial and municipal governments of approximately \$20.1 million. Of this, the federal, provincial and municipal governments received an estimated \$10.6 million, \$8 million and \$1.5 million respectively.

Table 13. Economic Impacts of Forest Innovation Research

Forest Innovation						
	Output (thousands)	GDP (thousands)	Employment (FTEs)	Federal Tax (thousands)	Provincial Tax (thousands)	Municipal Tax (thousands)
Direct	\$124,253	\$73,309	1,372	\$5,716	\$3,728	\$497
Indirect and Induced	\$94,432	\$43,488	696	\$4,846	\$4,349	\$994
Total	\$218,685	\$116,798	2,068	\$10,561	\$8,076	\$1,491

⁷⁸ The total spending in Table 11 is an estimate based on the information available. It may underestimate the actual forest research spending because the expenditures from organisations such as VIU, UNBC, SFU, the Pacific Forestry Centre and the soon to be completed Wood Innovation and Design Centre are not included. A more detailed table of funding amounts is provided in Appendix B

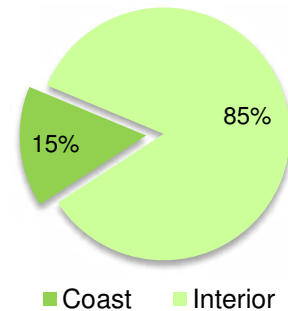
Silviculture

Highlights

- *Estimated revenue \$100 million*
- *Employment created 1,800 FTEs*
- *292 small businesses*
- *238 million seedlings planted in 2013 and 7 billionth cumulative tree planted*
- *BC's silviculture investment accounts for close to 50 percent of all silviculture expenditure in Canada*
- *Youth employment opportunities*

Regeneration and stand tending are the two main activities of the silviculture sector in BC. These two activities include products and services supplied by seed orchards and forest nurseries, site preparation, planting, vegetation management, spacing, pruning, fertilisation, brushing, commercial thinning and site rehabilitation activities.

Figure 11: Regional Share of Silviculture Sector Revenues



Almost 50 percent of all silviculture expenditures in Canada occur in BC.⁷⁹

The demand for the silviculture sector activities in BC is strong, as millions of hectares of pine beetle plagued timber in the interior region will require treatment to preserve habitat and other forest values. There is also an ongoing requirement to mitigate the threat of wildfire.

The industry also continues to invest in silviculture systems research trials. There are currently 23 large-scale and 11 small-scale trials being conducted throughout the province.⁸⁰

Total sector revenue was estimated to have been \$100 million in 2013.⁸¹ Of this revenue, approximately 85 percent was generated from the interior region and 15 percent from the coast region (Figure 11).



Reforestation after harvesting has been mandatory in BC since 1987. Silviculture considerations have become increasingly important, given the increased expectations and requirements placed on the forest resource. These include traditional requirements for preserving standing timber, recreation, water, aesthetics, cultural and spiritual elements and biodiversity. In addition, there are more recent requirements such as clean and renewable energy, which include carbon sequestration and storage and ecological services.

Silviculture activities tend to be labour intensive. The sector is comprised of many individuals and small contractors that supply products and provide services to the industry. Silviculture firms are small-sized businesses, and approximately 90 percent had less than 20 employees in 2013.⁸²

There are an estimated 292 firms operating in the silviculture sector in BC:

- Approximately 194 silviculture contractors, with 42 percent operating in the coast region.⁸³
- 28 nurseries and tree orchards, with about 40 percent operating in the coast region.⁸⁴
- An estimated 70 tree planting firms operating throughout the province.⁸⁵

In 2013, the 292 firms planted about 238 million seedlings, representing 21 different species.⁸⁶ In total approximately 170,000 hectares were planted, with 20,000 hectares planted in the coast region and the balance planted in the interior region. Tree planting is a seasonal activity lasting from four to nine months of the year. The work is physically demanding, and is generally done by younger workers. The sector

⁷⁹ Council of Forest Industries, Forest Facts, available here: <http://www.cofi.org/educationcareers/forest-education-links/forest-facts/>

⁸⁰ Kolotelo, Dave, "Tree Seed use in British Columbia: Current Practices and Future Directions". This is consistent with the member listing from Forest Nursery Association of BC

⁸¹ MNP estimates

⁸² Statistics Canada Cansim Table 551-0005. Note that this only includes companies with a determinate number of employees. The numbers of employees does not represent a full-time equivalent, but could be all full-time, all part-time, or any combination.

⁸³ B.A. Blackwell & Associated Ltd. "British Columbia Silviculture Sector Labour Population and Activity Study." For the Western Silviculture Contractors' Association, <http://www.wsca.ca/>

⁸⁴ Kolotelo, Dave, "Tree Seed use in British Columbia: Current Practices and Future Directions". This is consistent with the member listing from Forest Nursery Association of BC

⁸⁵ This is the number registered with the BC Forest Safety Council according to the Western Silviculture Contractors Association

⁸⁶ Forest Practices Branch, Ministry of Forests and Range. Numbers are not reported as calendar years so the actual number in calendar 2013 may differ

provides summer employment opportunities for students in areas of planting, insect and disease surveys, research and fire fighting.

In March 2013, BC reached a milestone in its seven billionth cumulative tree planted. BC also has over 80,000 kilograms of seed in storage, enough for an additional eight billion seedlings.⁸⁷

As shown in Table 14 the economic impacts of the silviculture sector in 2013 are estimated to have been:

- Total economic output of \$167 million.
- Total GDP impacts of \$79 million. Direct GDP was approximately \$53 million.
- Total employment generated of 1,812 FTEs. Of this, the sector employed an estimated 1,424 FTEs⁸⁸ and supported an additional 388 FTEs in other sectors.
- Total revenue created for federal, provincial and municipal governments of approximately \$12 million. Of this, the federal, provincial and municipal governments received an estimated \$6 million, \$5 million and \$1 million respectively.

Table 14. Economic Impacts of the Silviculture Sector

Silviculture						
	Output (thousands)	GDP (thousands)	Employment (FTEs)	Federal Tax (thousands)	Provincial Tax (thousands)	Municipal Tax (thousands)
Direct	\$100,450	\$53,063	1,424	\$3,574	\$3,159	\$429
Indirect and Induced	\$66,235	\$25,850	388	\$2,259	\$2,084	\$402
Total	\$166,685	\$78,913	1,812	\$5,833	\$5,243	\$830

⁸⁷ Kolotelo, Dave, "Tree Seed use in British Columbia: Current Practices and Future Directions". This is consistent with the member listing from Forest Nursery Association of BC

⁸⁸ The silviculture industry employs primarily part-time or seasonal staff. According to the 2013 BC Silviculture Labour Market Information (LMI) and Training Needs Report prepared by Dialogue Research, it is estimated that the silviculture industry employed 6,382 people in 2013. The total employment in 2013 was converted to an FTE number using information from the report. Retrieved from: <http://wsca.ca/Media/Multimedia/Interm%202013%20Report%20-%20Final.pdf>

ECONOMIC IMPACT COMPARISON WITH OTHER INDUSTRIES

Industry Comparisons

To provide perspective on the relative size of the economic impacts of the BC forest industry, it is useful to provide a comparison with other large industries and initiatives in BC. In this section we compare the economic impacts of the BC forest industry with those of five important industries and projects.

1. **Natural Gas Industry.** A study published by IHS Global Insight⁸⁹ in December 2009 reported on provincial economic impacts of the natural gas industry in Canada in the year 2008. According to the study, the sector was defined to include the following activities:
 - Natural gas and gas liquids extraction (production).
 - Support and drilling establishments (contractors) for upstream natural gas operations.
 - Natural gas pipeline transportation (long distance), including storage.
 - Natural gas distribution, including local utilities as well as marketers and brokers.
 - Natural gas engineering construction services for upstream, midstream, and downstream natural gas operations.
2. **Liquefied Natural Gas Industry (LNG).** In February 2013, Grant Thornton prepared studies for the Ministry of Energy, Mines and Natural Gas that estimated the employment impacts of ongoing operations of proposed LNG projects.⁹⁰
3. **Mining Industry.** In October 2011, PricewaterhouseCoopers (“PwC”) completed a report that estimated the economic impacts generated by the BC mining industry in 2010.⁹¹
4. **2010 Winter Olympic Games.** In February and March 2010, BC was host to the 2010 Olympic and Paralympic Winter Games. A series of reports prepared by PwC estimates the economic impacts of the Olympics on the BC economy over the years 2003 to 2010.⁹²
5. **Film and Television Industry.** In 2005 the Province of BC commissioned InterVISTAS Consulting Inc. to undertake a comprehensive economic study of the BC film and television industry.⁹³ The study estimated the GDP and employment contribution of the industry based on a five year average of production spending.

⁸⁹ IHS Global Insight (Canada) Ltd. “The Contributions of the Natural Gas Industry to the Canadian National and Provincial Economies” for America’s Natural Gas Alliance. December 2009

⁹⁰ Grant Thornton, “Employment Impact Review” for the Ministry of Energy, Mines and Natural Gas. February 2013

⁹¹ PricewaterhouseCoopers, “Economic Impact Analysis” for the Mining Association of BC. October 2011. The economic impact modelling approach is consistent with the approach used in this study

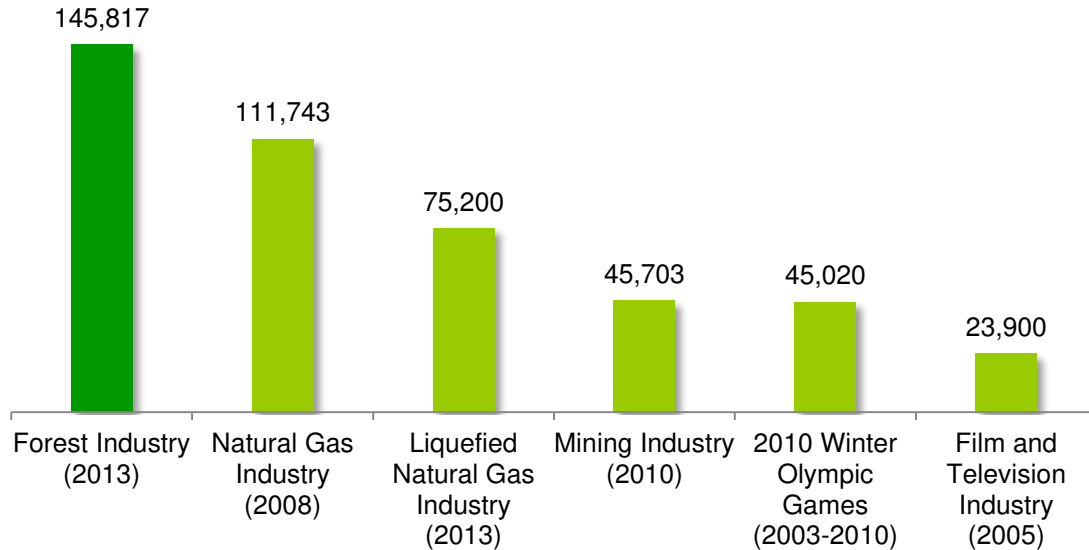
⁹² PricewaterhouseCoopers, “The Games effect”. 2010. While direct economic impacts are not reported separated from total impacts, meaningful comparisons can still be made

⁹³ InterVISTAS, “Film and Television Industry Review” for the Ministry of Economic Development. October 2005

Employment Comparison

As shown in the Figure 12, the employment generated by the BC forest industry in BC in 2013 was more than the employment reported for the natural gas industry, five proposed liquefied natural gas industry projects, the mining industry, 2010 Winter Olympic Games and the film and television industry. The BC forest industry supported 145,817 FTEs which was comparable to the natural gas industry, and more than three times the employment generated by the mining industry and the 2010 Winter Olympic Games.

Figure 12: Comparison of Employment Impacts by Industry (full-time equivalent positions - annual impacts unless otherwise stated)



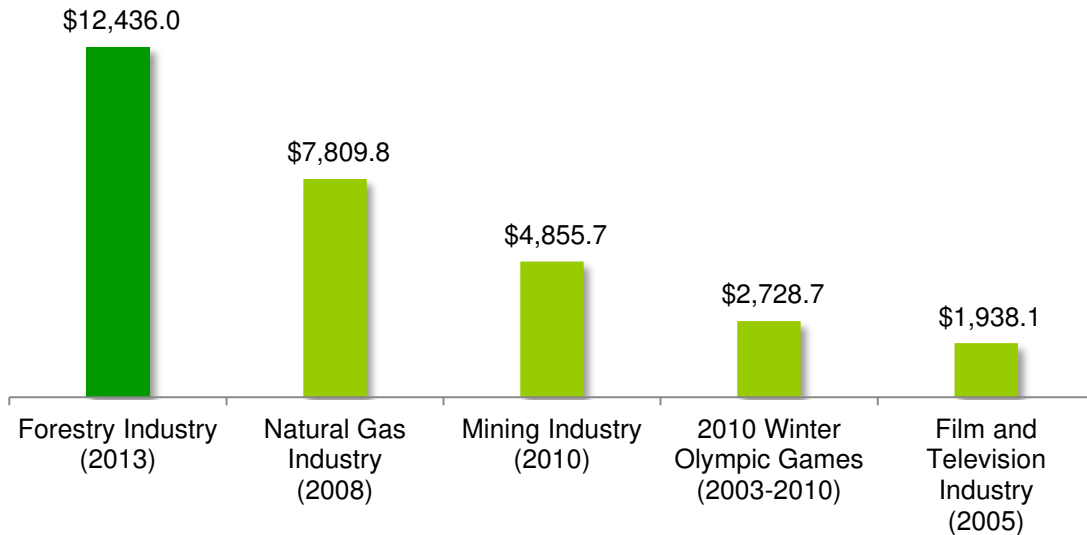
Note: For the 2010 Winter Olympic Games, direct, indirect and induced employment impacts over the period 2003 to 2010 are reported.

The annual employment estimate for the liquefied natural gas industry is for the annual operations of the five proposed LNG projects.

GDP Comparison

As shown in Figure 13, the estimated GDP contribution of the BC forest industry to the provincial economy in 2013 was more than double the reported GDP of the mining industry and more than the combined reported GDP contribution of the mining industry, 2010 Winter Olympic Games, and the film and television industry.

Figure 13: Comparison of GDP Impacts by Industry (\$2013) (annual impacts unless otherwise stated)



Note: For the 2010 Winter Olympic Games, direct, indirect and induced GDP impacts over the period 2003 to 2010 are reported.

GDP estimates have been adjusted to 2013 dollars.

5. SOCIAL AND ECONOMIC BENEFITS

The following case studies illustrate some of the broader economic, social and community contributions of the BC forest industry. Information used to prepare the case studies was obtained through a review of publicly available secondary sources.

The BC Forest Industry's Resiliency and Adaptability

The BC forest industry has faced unprecedented change and adversity, in the past decade. The mountain pine beetle infestation, the collapse of the US housing market, the global economic crisis and land use decisions are among the challenges faced by the industry.

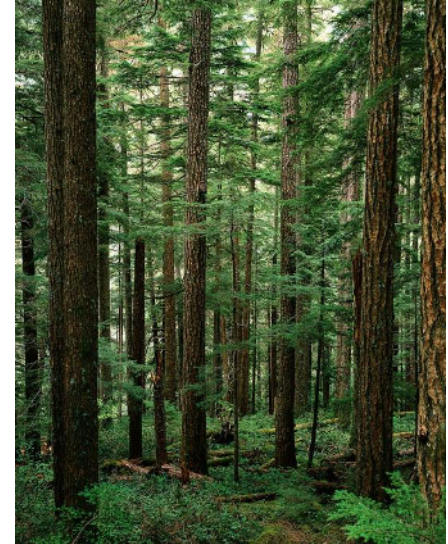
Companies have made investments in equipment to retool operations, and have made difficult capacity rationalisation decisions to maintain competitiveness, and to better respond to depressed product prices and demand reductions. Industry stakeholders have worked collaboratively to develop new products and to explore new markets.

The industry's response has been one of resiliency and adaptability. New industry sectors, such as bioenergy and wood pellets, have emerged in response to cost competitive pressures in the pulp sector and the mountain pine beetle infestation. A study completed in 2013 suggested that the BC Bioenergy Network's \$16.6 million of project funding resulted in new investments for a total project value of \$123.5 million, which represented 1,826 FTEs of employment, \$106 million in GDP and \$19.75 million in tax revenue for government.⁹⁴

As of 2013, BC had 13 wood pellet plants with total annual capacity of 2 million tonnes. Together with dedicated port storage and handling infrastructure, this represented over \$500 million in capital investment. BC's wood pellet industry generated more than \$300 million annual revenue in 2012, while providing approximately 400 direct jobs in rural BC communities.⁹⁵

Business success stories have emerged as forest operations have resumed production under new ownership. For example, the employee-owned Harmac Pacific pulp mill restarted production in 2008, generating an estimated \$250 million in annual revenue and employing approximately 300 people.⁹⁶ The mill has also invested in a cogeneration plant to offset its production costs and sell surplus power to the grid.

Similarly, Conifex Timber Inc. purchased one of Pope and Talbot's sawmill operations in Fort St. James in 2008. Since then the company has acquired additional sawmill capacity and is in the process of converting an idled newsprint mill in Mackenzie for bioenergy generation.



⁹⁴ Study by MMK Consulting in 2013, available here: <http://bcbioenergy.ca/our-value/helping-our-economy/>

⁹⁵ Wood Pellet Association of Canada, Position Paper July 2013, available here: http://www.pellet.org/images/2013-07-17_WPAC_Fibre_Supply_Issue.pdf Accessed May 2014

⁹⁶ Business Review Canada, "Harmac Pacific – High Quality Pulp", available here:

<http://www.businessreviewcanada.ca/reports/harmac-pacific> and Pioneer Timber Group, available here: pioneerfamilytimber.com

Effects of Mill Closures on Forest-Dependent Communities



The BC forest industry has a long history of contributing to the livelihood and social well-being of the communities and regions in which it operates. Consequently, when a forest products operation closes in a forest-dependent community, the adverse effects can be felt throughout the community. There are several examples throughout the province of the adverse effects of mill closures in forest dependent communities. Squamish, Campbell River, Gold River, Tahsis, Kelowna, Williams Lake, Fort Nelson, Prince Rupert and Terrace are among the communities that have experienced the detrimental effects of mill closures. In addition to the immediate impacts on employment, population and local businesses, the closure of forest industry operations may have additional impacts on property values, the maintenance of local infrastructure, healthcare services, schools operations and access to amenities, such as sports and recreation facilities.

For example, the reduction in population in the small communities of Gold River, Mackenzie and Tahsis over a 15 year period was 38 percent, 42 percent and 66 percent respectively after mill closures.⁹⁷ The median income in Gold River decreased by 17 percent over the same period.⁹⁸

⁹⁷ Population statistics are from Statistics Canada Census profiles and the National Household Survey, 2011

⁹⁸ Median income statistics are from Statistics Canada Census profiles and the National Household Survey, 2011

Innovation – Emergence of New Non-Traditional Products

One of the BC forest industry's competitive advantages is that BC forests yield a variety of softwood species which are considered to be among the highest quality fibre in the world. In BC, the dominant species and majority of lumber production (approximately 80 percent) is a combination of spruce, pine and fir (SPF). The remaining production is equally distributed between western red cedar, hemlock,⁹⁹ douglas-fir and other species.¹⁰⁰ The fibre characteristics of these species, such as strength and appearance, lend themselves well to a variety of applications. In addition to traditional forest products (such as lumber, pulp, paper and panels), the forest industry continues to invest in research to develop new products (such as specialty cellulose fibre used to produce new synthetics).

FPInnovations, one of the world's largest private, non-profit forest research centres, has facilities in BC and collaborates with members in the private sector, as well as with research, academic, federal and provincial government partners. The organisation helps bring together research and development and engineering resources and financial support from government partners.¹⁰¹

Genome BC, a research organisation that invests in and manages genomics and proteomics research projects across a number of sectors,¹⁰² also supports BC's forestry industry by providing funding for strategic genomics initiatives in forestry. One of the initiatives funded by Genome Canada and Genome BC is the Treenomix project, a multi-year \$11 million undertaking that focused on two areas critical to the future of the Canadian forestry industry: forest health (disease and pest resistance) and wood formation and quality. The project aimed to develop genomics and proteomics resources for two groups of forest tree species: spruce and poplar, and to determine which genes and markers correlate with desirable forest health and wood quality traits.¹⁰³

The Ministry of Forests, Lands and Natural Resource Operations also conducts in-house science, research and reporting on a number of forestry-related issues.¹⁰⁴ The Ministry is using new technology in testing LiDAR sensing technology to updated forest inventory information. The technology is providing quality information in a shorter time period enabling better informed decisions related to the forest resource.



New usage for BC forest industry's products is also being explored such as increased use of wood in non-residential construction through the Wood First Initiative. Collectively, these initiatives and investments help to optimise the value and use of the quality fibre in BC and add to the forest sector's contribution to BC's and Canada's overall economy.

⁹⁹ Hem-Fir is a species combination of Western Hemlock and five species of Fir

¹⁰⁰ BC Ministry of Forests, Lands and Natural Resource Operations

¹⁰¹ Forest Product Innovations, "About Us", available here: <https://fpinnovations.ca/about-us/Pages/default.aspx>

¹⁰² Genome BC, available here: <http://www.genomebc.ca/>

¹⁰³ Treenomix: Mechanisms of Wood Formation and Pest Resistance in Forest Trees Using Spruce, Poplar and Arabidopsis, available here: <http://www.genomebc.ca/portfolio/projects/forestry-projects/completed/treenomix-mechanisms-of-wood-formation-and-pest-resistance-in-fo/>

¹⁰⁴ Government of BC, "Forest and Land Carbon, available here: <http://www.for.gov.bc.ca/het/climate/carbon/index.htm>

First Nations Forestry Initiatives

Provincial forest policy and further development of relationships in BC based on aboriginal rights and title have provided First Nations communities in BC with greater access to forests for revenue sharing and forest tenure opportunities. Since 2002, the Ministry of Forests and Range has signed forest tenure agreements with 175 of the 203 First Nations in BC, providing \$324 million in revenue-sharing and access to 63.2 million cubic metres of timber.^{105,106}

The Haida Nation is one example of how a First Nation has taken control of forestry opportunities within its territory and is generating economic benefit for the Haida Nation. A forestry company of the Haida Enterprise Corporation, the Taan Forest Limited Partnership ("Taan") continues to grow since its inception in 2011.¹⁰⁷ The company acquired TFL 60 in June 2012 for \$12.2 million to supplement its forest tenure in the Haida Gwaii timber supply area for a combined annual allowable harvest of over 440,000 cubic metres.¹⁰⁸ The acquisition of TFL 60 provides the company with a significant share of Haida Gwaii tenure, which is managed sustainably and achieved Forest Stewardship Council (FSC) certification in 2011. This was the first forest to be certified according to the 'gold standard' for sustainable forest management since 2009.¹⁰⁹



Along with this standard, Taan supports the cultural values of Haida people as it invests an additional \$4 per seedling to plant cedar within its silviculture operations,¹¹⁰ a cost that is also impacted through the use of biodegradable protectors on each tree to keep deer from damaging the young trees.¹¹¹

The company maintains a strong focus on employing Haida members through its Taan office, joint ventures, operations and agreements with subcontractors. In all, these employees contribute to annual sales of more than \$30 million, which is a significant driver of the more than \$2 million in annual profit returned to Haico.¹¹²

¹⁰⁵ British Columbia Newsroom, Office of the Premier, "B.C. invests \$8.4 million to develop markets for B.C. wood products" News Release, April 5, 2013

<http://www.newsroom.gov.bc.ca/2013/04/bc-invests-84-million-to-develop-markets-for-bc-wood-products.html>

¹⁰⁶ First Nations in BC, "BC Assembly of First Nations" <http://fnbc.info/org/bc-assembly-first-nations>, Accessed September 2014

<https://www.aadnc-aandc.gc.ca/eng/1100100021009/1314809450456>

¹⁰⁷ IINAASDLL – The Haida Enterprise Quarterly Newsletter, Winter 2014 (Issue 07, p.6)

<http://www.haico.ca/downloads/haiconlvol3issue7.pdf>

¹⁰⁸ <http://www.marketwired.com/press-release/haico-acquires-tree-farm-licence-60-new-financing-for-haida-tourism-1675245.htm>

¹⁰⁹ <http://www.rainforest-alliance.org/newsroom/press-releases/taan-forest-certification>

¹¹⁰ IINAASDLL – The Haida Enterprise Quarterly Newsletter, Fall 2013 (Issue 06, p.8)

http://www.haico.ca/downloads/haiconl_vol2issue6_final2lorespdf.pdf

¹¹¹ IINAASDLL – The Haida Enterprise Quarterly Newsletter, Winter 2014 (Issue 07, p.6)

<http://www.haico.ca/downloads/haiconlvol3issue7.pdf>

¹¹² IINAASDLL – The Haida Enterprise Quarterly Newsletter, June 2013 (Issue 05, p.12). <http://www.haico.ca/downloads/haico-newsletter-issue-5.pdf>

Access for Tourism, Recreation and Commercial Harvesting

The BC forest industry's investment in building road infrastructure has provided access to BC's backcountry. This access provides a variety of experiences for British Columbians and tourists attracted by the natural surroundings. Recreational activities, such as mountaineering, kayaking, canoeing, hunting, fishing and wildlife viewing are often accessed through logging roads. Forest recreation sites are located throughout the province and provide rustic camping facilities for outdoor enthusiasts.

The resource road infrastructure also provides access for many First Nations communities that regularly use these roads for travel. At least 25 First Nations communities in BC are only accessible by these roads.¹¹³



In addition to tourism, recreation and access, the road infrastructure creates access and possibility for other industries, such as commercial harvesting of wild edible mushrooms from BC's forests, such as the pine mushrooms and chanterelles, or salal for use as floral greenery.



BC's primary wild mushroom products are pine mushrooms (with harvests of over 250 tonnes per year), chanterelles, morels and boletes.¹¹⁴ Pine mushrooms are exported primarily to Japan, while chanterelles and morels are destined for European markets. Royal Roads University's Centre for Non-Timber Resources estimated the value of wild harvested mushrooms ranged between \$10 and \$42 million per year from 1995 to 2004.¹¹⁵ Pine mushrooms account for the majority of the harvested value.

Similarly, floral greens, which are used as accents in floral arrangements, have ranged between \$27 and \$65 million per year from 1995 to 2004.¹¹⁶ Of the traded floral greens, salal is estimated to comprise about 85 to 95 percent and the main markets are Europe (30 to 40 percent) and the United States (60 to 70 percent).¹¹⁷

¹¹³ First Nations BC Forest Safety Council http://www.bcfoerstsafe.org/council_initiatives/first_nations.html

¹¹⁴ Natural Resources Canada, Forest Renewal BC, Small Woodlands Program of BC, "Managing Your Woodland:", <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/20291.pdf>

¹¹⁵ Royal Roads University, "Critical Information for Policy Development and Management of Non-Timber Forest Products in British Columbia", http://www.for.gov.bc.ca/hfd/library/FIA/2006/FSP_Y061065d.pdf

¹¹⁶ Ibid

¹¹⁷ Ibid

6. APPENDICES

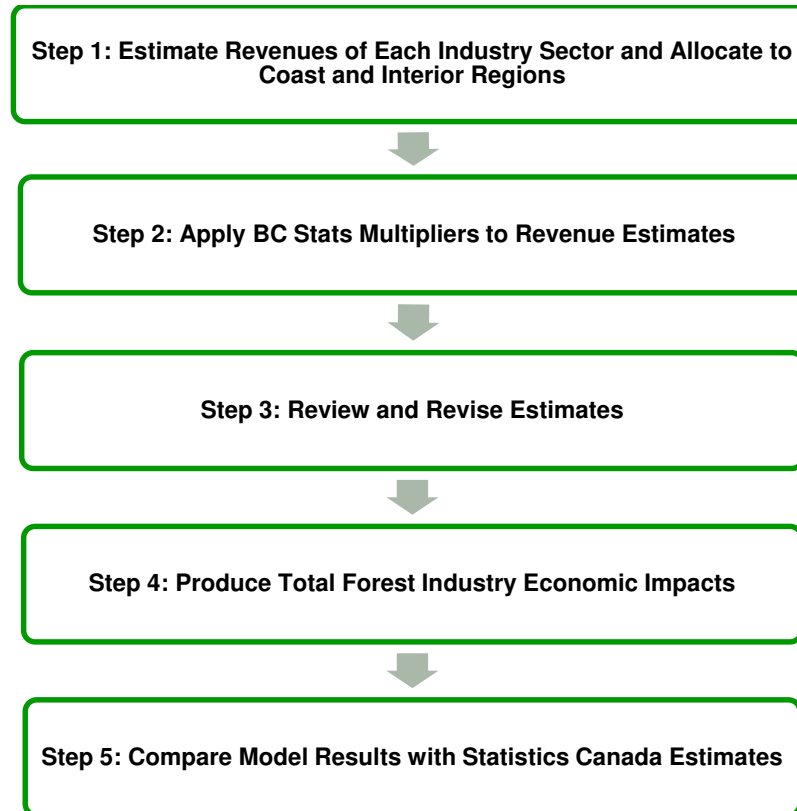
APPENDIX A – GLOSSARY OF ECONOMIC TERMS

Term	Definition
Output	<ul style="list-style-type: none"> Output is the total gross value of all business revenue. This is the broadest measure of economic activity.
GDP	<ul style="list-style-type: none"> GDP is the “value added” to the economy (the unduplicated total value of goods and services).
Government Tax Revenue	<ul style="list-style-type: none"> Government tax revenue is the total amount of tax revenue generated for different levels of government, including municipal, provincial and federal taxes.
Employment	<ul style="list-style-type: none"> The number of additional jobs created, measured in full-time equivalent employees (FTEs).
Direct Impacts	<ul style="list-style-type: none"> Direct impacts are changes that occur in front-end businesses that receive expenses or operating revenue as a direct consequence of an industry.
Indirect Impacts	<ul style="list-style-type: none"> Indirect impacts are changes in the activity of suppliers to front-end businesses. Indirect impacts include the spending suppliers make when purchasing goods and services.
Induced Impacts	<ul style="list-style-type: none"> Induced impacts are due to shifts in spending on goods and services as a consequence of the payroll of the directly and indirectly affected businesses. Induced impacts reflect the additional spending by employees of the front-end businesses and suppliers.

APPENDIX B – ECONOMIC IMPACT APPROACH AND ASSUMPTIONS

Overview

MNP's estimates of economic impacts have been developed using BC Stats input-output model and related economic multipliers. A step-by-step overview of our approach is provided below.



Step 1: Estimate the Revenue of Each Industry Sector and Allocate to Coast and Interior Regions

The first step to estimate the economic impacts of the BC forest industry was to estimate the revenue received by each sector in 2013. Our approach and main assumptions used to estimate revenue for each sector are summarised in the following sections.

Primary Manufacturing

MNP used the sales of goods manufactured (shipments) by primary manufacturing firms in BC from Statistics Canada Cansim Table 304-0015 to estimate the revenue of the forest industry's primary manufacturing sector. MNP has assumed the sales of goods manufactured are a good proxy of the total revenue.

The BC forest industry primary manufacturing sector was defined as firms categorised in the following NAICS codes:

- Sawmills and wood preservation [NAICS code 3211]
- Veneer, plywood and engineered wood [NAICS code 3212]
- Pulp, paper and paperboard manufacturing [NAICS code 3221]

MNP allocated primary manufacturing revenue to the coast and interior regions based on the total value of primary forest products manufactured in each region. To estimate this, MNP relied on total lumber, pulp and paper and panel board production values from Statistics Canada and forest company annual reports, as well as the average sales price for the products from the coast and interior.

Forest Management

The annual revenue of the forest management sector was estimated as the product of the number of forest management firms operating in BC and the average annual revenue of those forest management firms. The estimated number of forest management firms operating in BC was collected from Statistics Canada Cansim Table 551-0005. The average revenue for forest management firms was retrieved from Industry Canada's SME Benchmarking tool.

The forest management industry has been defined as firms categorised in the following NAICS codes:

- Logging (except contract logging) [NAICS code 113311]
- Contract logging [NAICS code 113312]
- Support activities for forestry¹¹⁸ [NAICS code 115310]

MNP has assumed that revenue received by forest management firms is from operations in BC and therefore all revenue is attributable to economic impacts in the province.

To estimate the coast and interior allocation of forest management revenue, MNP estimated the total value of timber harvested from the coast and interior regions. To calculate this, MNP relied on harvest data from the Harvest Billing System and timber values from the Ministry of Forests Land and Natural Resource Operations' Log Market Reports.

Secondary Manufacturing

MNP used the sales of goods manufactured (shipments) by secondary manufacturing firms in BC from Statistics Canada Cansim Table 304-0015 to estimate the revenue of the secondary manufacturing sector in BC. MNP has assumed the sales of goods manufactured are a good proxy of the total revenue received by secondary manufacturing firms in the province.

The secondary manufacturing industry has been defined as firms categorised in the following NAICS codes:

- Other wood product manufacturing [NAICS code 3219]
- Converted paper product manufacturing [NAICS code 3222]
- Wood kitchen cabinet and counter top manufacturing [NAICS code 33711]
- Other wood household furniture manufacturing [NAICS code 337123]

To estimate the coast and interior allocation of secondary manufacturing-based revenue, MNP estimated the regional allocation of secondary manufacturing firms from the "Study of Lumber Remanufacturing in British Columbia Post-Implementation of the Canada-US 2006 Softwood Lumber Agreement"¹¹⁹ published on the Ministry of International Trade's website.

Fibre Supply and Wholesale

The annual revenue of the fibre supply and wholesale sector was estimated as the product of the number of fibre supply and wholesale businesses operating in BC and the average annual revenue of those fibre supply and wholesale firms. The estimated number of sales and export firms operating in BC was collected from Statistics Canada Cansim Table 551-0005 and the Federation of BC Woodlot Associations. The average revenue for sales and export firms was retrieved from Industry Canada's SME Benchmarking tool.

The fibre supply and wholesale sector has been defined as firms categorised in the following NAICS codes:

- Lumber, plywood and millwork wholesalers [NAICS code 416320]
- Log and wood chip wholesalers and brokers [NAICS code 419120]

MNP has assumed that revenue received by fibre supply and wholesale firms is from operations in BC, and therefore all revenue is attributable to economic impacts in the province. Note that exports of log, commodity

¹¹⁸ Note that both silviculture and forest management have firms in NAICS code 115310. In order to ensure there was no double counting, the number of silviculture firms in NAICS code 115310 was removed from the support activities for forestry under the forest management sub-industry

¹¹⁹ Ministry of International Trade [September 2007], available here:

<http://www.mit.gov.bc.ca/softwood/Lumber%20Reman%20Final%20Report%20Sept%2028%202007%20with%20cover.pdf>

and traditional value-add forest products are included in the revenue estimates for fibre supply and wholesale firms, as well as primary and secondary manufacturing firms.

To estimate the coast and interior allocation of fibre supply and wholesale revenue, MNP estimated the regional distribution of log wholesalers and brokers from the Federation of BC Woodlots 'Log and Lumber Buyer Database'.

Forest Innovation

Revenue for the forest innovation sector was defined as the total research and development funding provided to public and non-profit research organizations such as universities, FPInnovations and research networks. Research and development spending of private forest companies was not included, as that spending would be captured in the revenue estimates for other sectors.

The following table summarises the estimated research funding for 2013. Every effort was made to report the value spent in 2013; however, in cases where the funding is for a 2012/2013 fiscal year or part of a multi-year project, the 2013 value was estimated.

Table B-1. Forest-related Grants, Research Funding and Investment Dollars

Research Organisation/ Funding Source	Description	Value	Source
University of British Columbia – Faculty of Forestry	Total funding from extramural sources	\$11,206,291	http://www.forestry.ubc.ca/annual-report/
FPInnovations	Annual operating budget	\$89,736,000	https://fpinnovations.ca/MediaCentre/AnnualReports/2012-2013-annual-report.pdf
Forest Innovation Investment	Total funding for market and product development	\$9,021,000	http://www.bcfii.ca/wp-content/uploads/aboutus/corporate/corporate-reports/archive-of-corporate-reports/FII-Service-Plan-Annual-Report-2012-13.pdf
Investments in Forest Industry Transformation Program (IFIT)	Federal government grants to BC organisations	\$3,400,000	http://www.nrcan.gc.ca/media-room/news-releases/2013/1865
Northern Development Initiative Trust	Funding for Pine Beetle projects	\$993,570	http://www.northerndevelopment.bc.ca/wp-content/uploads/2012/01/2013-Annual-Report.pdf
BC Bioenergy Network	Wood biomass grants and research	\$1,395,833	http://www.bcbioenergy.ca/wp-content/uploads/2013/04/BCBN-PerfRep0813-Web.pdf
University of Victoria - Centre for Forest Biology	Funding for NSERC Create Program in Forests and Climate Change	\$500,000	http://web.uvic.ca/forbiol/news and discussions with researchers.
Government of BC	Project to updated the forest inventory plan	\$8,000,000	http://www.newsroom.gov.bc.ca/2013/02/bc-releases-10-year-forest-inventory-plan.html
Total		\$124,252,694	

Forest innovation-based revenue was allocated to the coast and interior regions based on the location of the research institution or grant-receiving firm.

Silviculture

The annual revenue of the silviculture industry was estimated as the product of the number of silviculture firms operating in BC and the average annual revenue of those silviculture firms. The estimated number of silviculture firms operating in BC was collected from Statistics Canada Cansim Table 551-0005, the Forest Nursery Association of BC and the Western Silviculture Contractors' Association. The average revenue for silviculture firms was retrieved from Industry Canada's SME Benchmarking tool.

The silviculture industry has been defined as firms categorised in the following NAICS codes:

- Forest orchards and nurseries [NAICS code 113210]
- Tree planters [NAICS code 115310]
- Silviculture contractors [NAICS code 115310]

MNP has assumed that revenue received by silviculture firms is from operations in BC and therefore all revenue is attributable to economic impacts in the province.

To estimate the coast and interior allocation of silviculture-based revenue, MNP estimated the total value of seedlings planted in the Coast and Interior regions based on information from the Ministry of Forests, Lands and Natural Resource Operations.

Step 2: Apply BC Stats Multipliers to the Revenue Estimates

To estimate the economic impacts of each sector from the revenue estimates, MNP mapped the revenue estimates to economic impact multipliers published by BC Stats. The multipliers produced a preliminary estimate of economic impacts, including output, GDP, employment and tax revenue.

Step 3: Review and Revise Estimates

After producing the initial economic impact estimates for each sector, MNP reviewed the employment estimates for each sector and the estimate of government revenue. Revisions were made to employment and tax revenue as outlined below.

Employment

MNP revised the employment (FTE) values for consistency with published Statistics Canada employment figures. Statistics Canada's annual employment numbers were retrieved from Cansim Table 281-0023. The employment number published by Statistics Canada included the number of total jobs and is not necessarily an FTE equivalent. To convert the employment number to an FTE equivalent, MNP revised the employment numbers by comparing the average weekly hours of the typical employee to an FTE definition of 2,080 annual hours (i.e. 40 hours per week). Data on average weekly hours was obtained from Statistic Canada Cansim Table 281-0032.

An exception to the above approach was the FTE equivalent calculation for the silviculture sector. The silviculture sector employs a large number of seasonal and/or part-time employees. To provide an estimate of the FTE equivalent employment in silviculture, the total employment in 2013 was converted to an FTE figure using information from the 2013 BC Silviculture Labour Market Information report.¹²⁰

Government Revenue

The BC Stats input-output model includes government revenue from such taxes as excise taxes, property taxes and income taxes. The multipliers do not account for additional government revenue, such as licenses, timber sales, and export fees. To estimate these values, the annual public accounts and budgets of the Government of BC were reviewed, and additional forest-related revenue was reported separately.

Step 4: Produce Total Forest Industry Economic Impacts

After developing the economic impact estimates and making revisions for employment and government revenue, MNP summed the individual sector impacts to produce an overall estimate for the BC forestry industry.

¹²⁰ Dialogue Research, "2013 BC Silviculture Labour Market Information (LMI) and Training Needs Report". 2014. Available here: <http://wsca.ca/Media/Multimedia/Interm%202013%20Report%20-%20Final.pdf>

Step 5: Compare Model Results with Statistics Canada

MNP compared its overall estimate of the direct GDP for the BC forestry industry with the GDP values published by Statistics Canada.

MNP retrieved Statistics Canada's GDP estimate from Cansim Table 379-0030. The following NAICS codes were included:

- Forestry and logging [NAICS code 113]
- Support activities for forestry [NAICS code 1153]
- Wood product manufacturing [NAICS code 321]
- Paper manufacturing [NAICS code 322]
- Household and institutional furniture and kitchen cabinet manufacturing [NAICS 3371]

The difference is presented in the following table.

Table B-2. GDP Differences

GDP Sources	Value
MNP's Direct GDP Estimate	5.8 billion
Statistics Canada GDP Estimate	6.7 billion

MNP's direct GDP estimate is approximately 13 percent lower than Statistics Canada's. We believe this to be for two primary reasons:

1. The NAICS codes used in MNP's analysis and the NAICS codes for Statistics Canada's GDP estimate do not match perfectly, which means additional GDP items may be included in the Statistics Canada estimate that are not included in MNP's analysis.
2. The definitions of what industries are included in Statistics Canada's and MNP's estimates may not be perfectly aligned. As such, some impacts included in MNP's 'indirect' economic impacts may be included in Statistics Canada's 'direct' GDP figures. In this case, the indirect economic impacts of MNP's analysis may be slightly overstated while the direct economic impacts may be slightly understated.

APPENDIX C – DATA SOURCES

Provincial Websites:

- BC Ministry of Forests, Lands and Natural Resource Operations, <http://www.gov.bc.ca/for/>
- BC Stats, <http://www.bcstats.gov.bc.ca>
- Forestry Innovation Investment, <http://www.bcfii.ca/>
- BC Lumber Trade Council, <http://www.bclumbertrade.com>
- Coast Forest Products Association, <http://www.coastforest.org>
- Council of Forest Industries, <http://www.cofi.org/>
- Naturally Wood, <http://www.naturallywood.com/>
- Western Silvicultural Contractors' Association, <http://www.wsca.ca/>
- BC Bioenergy Network, <http://bcbioenergy.ca/>
- Port Metro Vancouver , www.portmetrovanancouver.com

National and International Websites:

- Statistics Canada, <http://www.statcan.gc.ca/>
- Industry Canada, <http://www.ic.gc.ca>
- Wood Pellet Association of Canada, <http://www.pellet.org/>
- FPInnovations, <http://www.fpinnovations.ca>
- National Forestry Database, <http://nfdp.ccfm.org>
- Canadian Forest Service, <http://cfs.nrcan.gc.ca>
- Foreign Affairs and International Trade , www.international.gc.ca
- Madison's Lumber Reporter, <http://www.madisonsreport.com/>
- Random Lengths, www.rlpi.com
- RISI, www.risiinfo.com
- Natural Resources Canada, <http://www.nrcan.gc.ca>

APPENDIX D – ECONOMIC AND OTHER FACTORS AFFECTING THE INDUSTRY

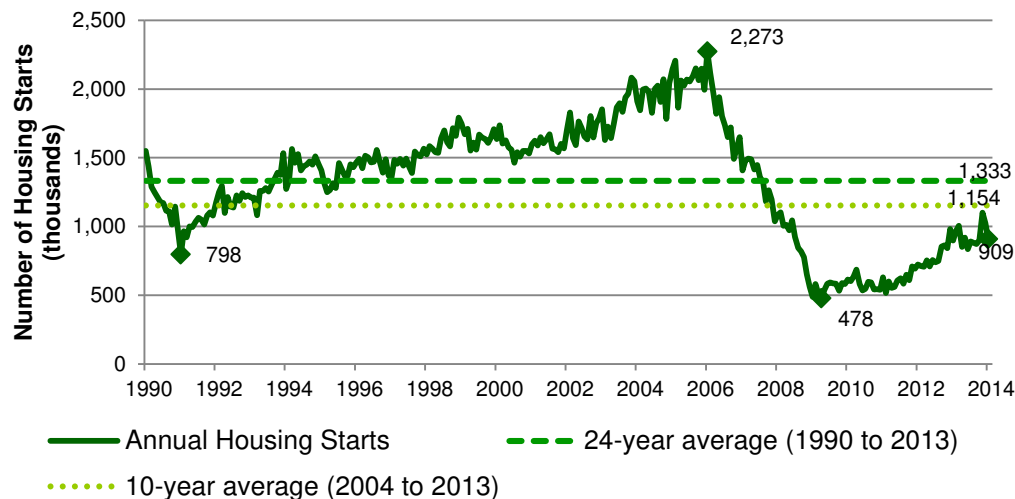
While there are many economic factors that affect the financial performance of the industry, the principal ones are: housing starts in the United States and Asia, foreign exchange rate fluctuations, energy costs, and transportation costs. The following sections contain an overview of the effects of these factors.

Housing Starts – United States

The United States is the largest export market for BC wood products, with demand being driven by residential construction. Consequently, the number of US housing starts is a strong indicator of the US demand for BC wood products.

At present, US housing starts have been in the range from 0.9 to 1.0 million units. This represents a significant recovery from the low of 478,000 starts in 2009, and is moving toward the 10 year average of 1.2 million starts and the 24 year average of 1.3 million starts.

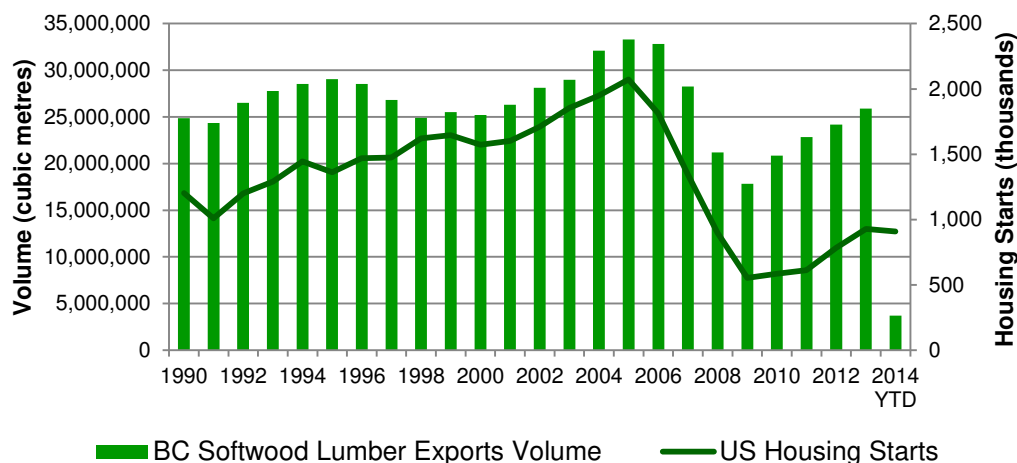
Figure D-1: US Housing Starts since 1990



Source: US Census Bureau, Seasonally Adjusted Annual Rate

Figure D-2 depicts the relationship between US housing starts and BC exports of softwood lumber. The chart highlights the historical dependency of BC's lumber manufacturing sector on the market in the United States.

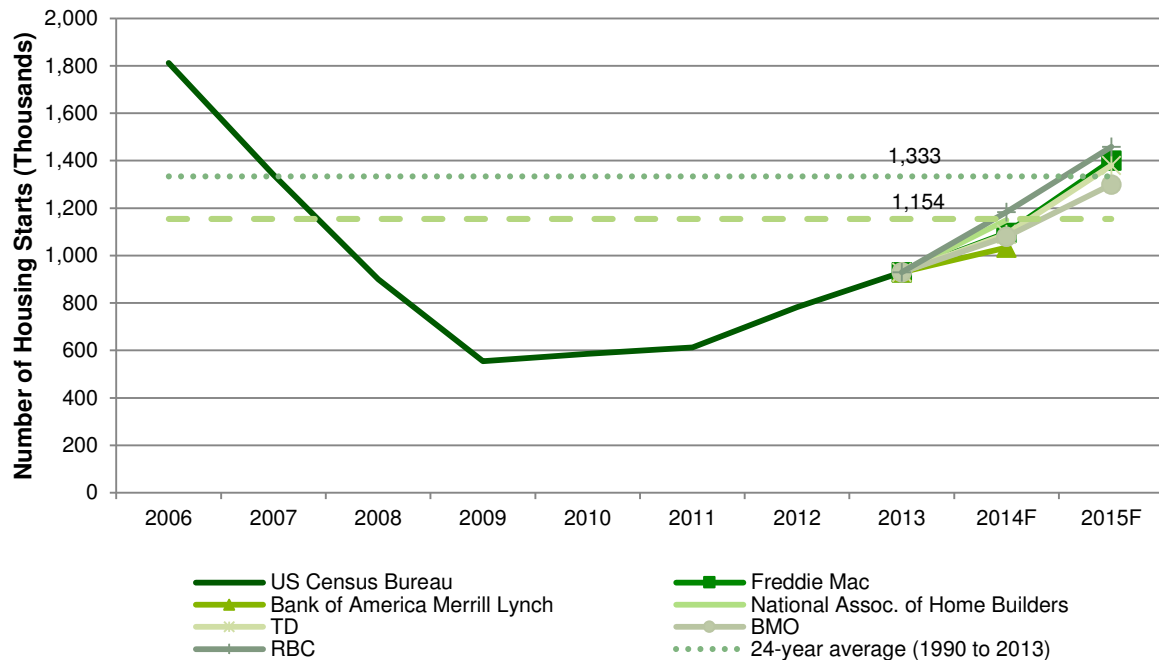
Figure D-2: BC Lumber Export Volumes Driven by US Housing Starts



Source: BC Stats, US Census Bureau

Some analysts (Figure D-3) predict that US housing starts will continue to recover and possibly exceed the historical 24-year average for annual housing starts over the next two years.

Figure D-3: Forecasts for US Housing Starts



Housing Starts – Asia

China is the second largest export market for BC's wood products. In recent years, China has seen a dramatic increase in real estate prices. In response, China's Ministry of Housing and Urban-Rural Development has targeted construction of 36 million units of affordable housing by 2015. Slower gains in house prices toward the end of 2013 may suggest that the increase in housing supply and other government tightening measures are having a cooling effect on the housing market.¹²¹

Housing starts in Japan are recovering from lows in 2009, and have trended upward for five consecutive years. Housing starts have been particularly strong in regions affected by the earthquake and tsunami in 2011. A demographic factor influencing the demand for BC's wood products and in particular from the coastal industry is the aging population in Japan which is believed to be responsible for a growing demand for senior housing.

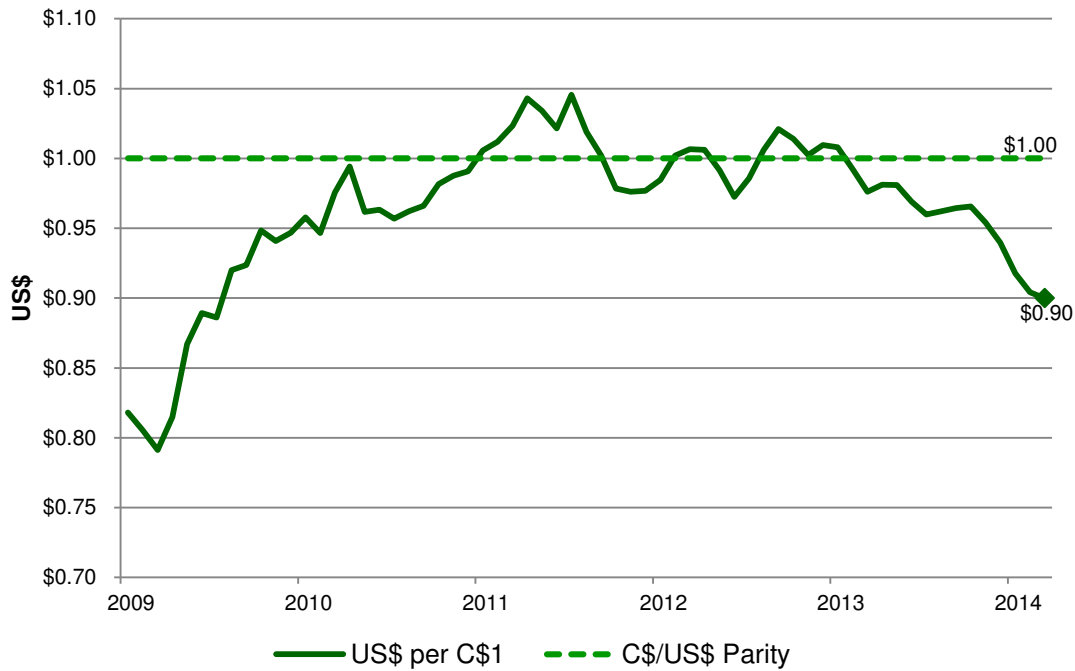
Foreign Exchange Rates

The majority of BC forest products sales are to export markets and are denominated in US dollars. As a result, the industry is sensitive to changes in the Canada-United States foreign exchange rate. These fluctuations affect the industry's profitability, particularly for raw material inputs purchased and products sold in US dollars and from foreign exchange gains or losses on the translation of US dollar denominated debt.

As shown in Figure D-4, since early 2013, the Canadian dollar has weakened against the US dollar. For the industry, this translates into higher revenue on US dollar denominated sales, which is partially offset by higher costs, such as chemical inputs and transportation.

¹²¹ CNBC, "China's Red Hot Housing Market Shows Signs of Easing", available here: <http://www.cnbc.com/id/101346957>

Figure D-4: Foreign Exchange Rate, US\$ per CAD\$1

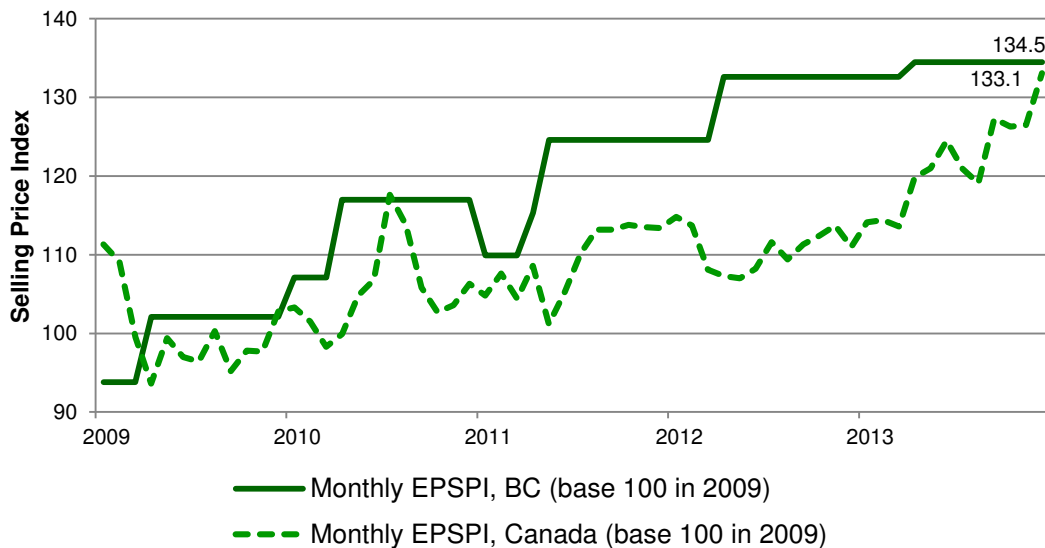


Source: OANDA Historical Exchange Rates

Energy costs

Energy is a significant cost for industry operations. Since 2009, the price of electricity for industrial customers has increased steadily. The Electric Power Selling Price Index (EPSPI) is a measure of the change in the price of electric power to industrial customers. As shown in Figure D-5, the EPSPI for BC has risen from a base of 100 in 2009 to 134.5 in 2013.

Figure D5: Electric Power Selling Price Index

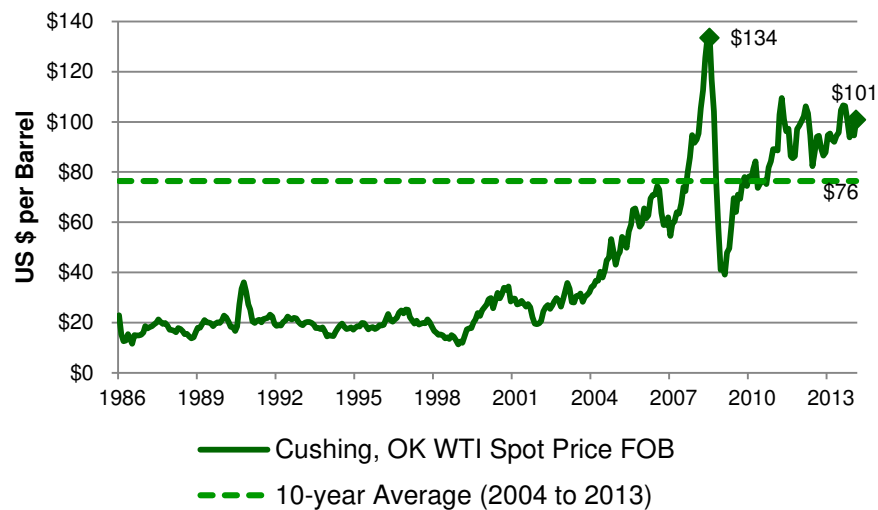


Source: Statistics Canada. Table 329-0073

It is estimated that for an average industrial customer, a 9 percent electricity rate increase equates to about \$139,000 per month.¹²² In response to rising energy costs, the industry has responded by investing in bioenergy projects to produce energy from wood residuals. Most BC pulp mills now have power generation capacity that helps to offset costs and creates opportunity for sale of excess power back to the grid. For example, the West Fraser Cariboo pulp mill's investment in a turbo generator has helped the mill achieve energy self-sufficiency and sell surplus power to BC Hydro.¹²³ West Fraser has also undertaken power generation projects at two sawmills in BC, and has long-term contracts to sell surplus power to BC Hydro.¹²⁴ Mercer's Celgar pulp mill has an agreement with BC Hydro to supply surplus power and in 2013 generated approximately \$12.3 million in revenue from energy sales.¹²⁵ The use of wood residuals to generate energy minimises or eliminates wood waste and helps to increase the economic yield from BC's forests without necessarily increasing the harvest level.

Trucking and freight costs represent another significant cost for the industry's operations. Transportation costs are closely linked to fluctuations in crude oil prices. Figure D-6, shows how the price of crude oil has increased over time and is higher than the 10-year average price of \$76 per barrel.

Figure D-6: Monthly Crude Oil Spot Prices (US\$ per Barrel)



Source: US Energy Information Administration

¹²² "10 Year Plan for BC Hydro", Ministry of Energy and Mines, November 2013

<http://www.newsroom.gov.bc.ca/downloads/Presentation.pdf> Accessed June 2014

¹²³ CNBC, "China's Red Hot Housing Market Shows Signs of Easing", available here: <http://www.cnbc.com/id/101346957>

¹²⁴ West Fraser, Management Discussion and Analysis, December 2013

¹²⁵ Mercer, Annual Report, December 2013

APPENDIX E – ABOUT MNP

For more than 65 years, MNP has proudly served and responded to the needs of clients in the public, private and non-profit sectors. Today, MNP is the fastest growing major chartered accountancy and business consulting firm in Canada with more than 75 locations and 3,000 team members across the country. In British Columbia, MNP is well-recognized across the province, with more than 700 team members located in 17 communities.



MNP provides a wide range of accounting, finance and business advisory services to clients. These include:

- Assurance
- Corporate Finance
- Enterprise Risk Services
- Consulting
- Succession
- Taxation
- Mergers and Acquisitions
- Forensic Accounting
- Insolvency and Corporate Recovery
- Valuations and Litigation Support