

THE CANADIAN FOREST SECTOR: A FUTURE BASED ON INNOVATION



FINAL REPORT OF THE STANDING SENATE COMMITTEE ON AGRICULTURE AND FORESTRY

THE HONOURABLE PERCY MOCKLER, CHAIR

THE HONOURABLE FERNAND ROBICHAUD, P.C., DEPUTY CHAIR

JULY 2011

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I would love to see our nation move to a sense of ambition, of world leadership and dominance in the way we express wood and the way we build with wood. We are wonderful at cutting down trees but we still export them and hope others use them well. We have to learn how to celebrate our own material in the architecture we do.

Michael Green, Architect.

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MEMBERS



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The Honourable Fernand Robichaud,
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The Honourable Senators:



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Hugh Segal

* Marjory LeBreton, P.C. (or Claude Carignan)

* James Cowan (or Claudette Tardif)

Other Senators who have participated from time to time in this study:

The Honourable Senators: Ataullahjan, Braley, Carignan, Chaput, Demers, Finley, Housakos, Hubley, Kochhar, Lovelace Nicholas, MacDonald, Marshall, Martin, Meighen, Merchant, Nolin, Raine, Runciman, Wallace and Wallin.

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Committee Clerks:

Kevin Pittman
Josée Thérien

**Analysts from the Parliamentary Information and
Research Service of the Library of Parliament:**

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Karen Hébert
David Surprenant

ORDER OF REFERENCE

Extract from the *Journals of the Senate*, Wednesday, June 15, 2011:

The Honourable Senator Mockler moved, seconded by the Honourable Senator Wallace:

That the Standing Senate Committee on Agriculture and Forestry be authorized to examine and report on the current state and future of Canada's forest sector. In particular, the Committee shall be authorized to:

- (a) Examine the causes and origins of the current forestry crisis;
- (b) Examine the federal role in the forest sector in Canada;
- (c) Examine and promote the development and commercialisation of value added products;
- (d) Examine potential changes to the National Building Code of Canada 2005 to increase the utilization of wood;
- (e) Examine education in the wood science sector;
- (f) Develop a vision for the long-term positioning and competitiveness of the forest industry in Canada; and
- (g) Recommend specific measures to be put forward by the federal government to lay the foundations of that vision.

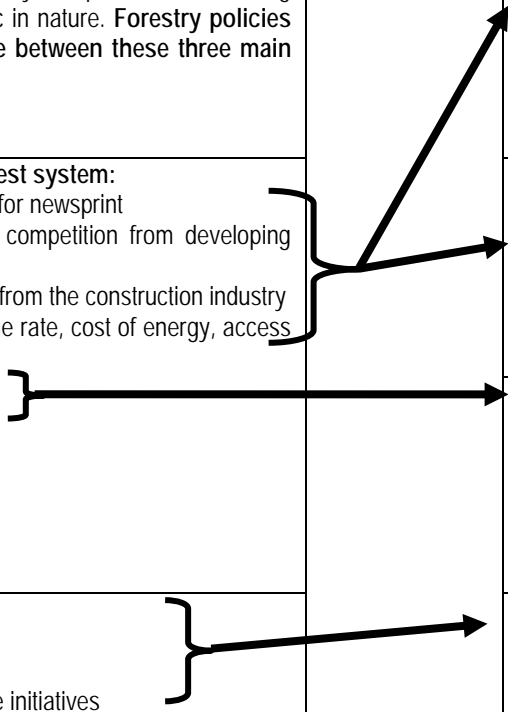
That the papers and evidence received and taken on the subject and the work accomplished since the beginning of the Second session of the Fortieth Parliament be referred to the Committee; and

That the Committee submit its final report to the Senate no later than September 30, 2011, and that the Committee retain all powers necessary to publicize its findings until December 31, 2011.

The question being put on the motion, it was adopted.

Schematic Summary of Report

PART I – PROBLEMS FACING THE FOREST SYSTEM AND HISTORICAL OVERVIEW OF THE FEDERAL GOVERNMENT’S ROLES AND RESPONSIBILITIES		PART II – POSSIBLE SOLUTIONS: A FOUR-PRONGED APPROACH	
CHAPTER I: THE CANADIAN FOREST: A HISTORICAL OVERVIEW AND SYSTEMIC APPROACH	The roles of the forest in Canada: The roles the forest in Canada play are quite diversified being ecological, social and economic in nature. Forestry policies should try to strike a balance between these three main roles.	CHAPTER V: CULTURAL, INSTITUTIONAL AND REGULATORY BARRIERS TO THE INCREASED USE OF WOOD AS A BUILDING MATERIAL	GOAL OF RECOMMENDATIONS: Increase the market share of wood in the construction industry, particularly in the non-residential and multi-storey sectors.
CHAPTER II: THE CAUSES OF THE CRISIS IN THE FOREST SYSTEM	Causes of the crisis in the forest system: a) Structural decline in demand for newsprint b) Decreased demand due to competition from developing economies c) Cyclical decrease in demand from the construction industry d) Aggravating factors (exchange rate, cost of energy, access to credit, etc.) e) Industry structure	CHAPTER VI: USING FOREST BIOMASS TO PRODUCE ENERGY	GOAL OF RECOMMENDATION: Increase the use of wood and wood residue as an energy source while preventing imbalances among users in the forest system and putting decision-making in the hands of individuals and communities.
CHAPTER III: THE EFFECTS OF THE CRISIS IN THE FOREST SYSTEM	Implications: Economic: job losses Social: impact on communities Ecological: impact on silviculture initiatives	CHAPTER VII: RESEARCH, DEVELOPMENT AND INNOVATION IN THE FOREST SECTOR	GOAL OF RECOMMENDATIONS: Adjust the industry's structure by increasing research and development, and fostering a culture of innovation among forestry companies.
CHAPTER IV: THE FEDERAL GOVERNMENT’S ROLES AND RESPONSIBILITIES IN THE FOREST SECTOR	Historically, federal involvement in forestry has focused on: •research and development; •sustainable development, ecosystem-based management and climate change; •regional and community development; and •development of international markets and resolution of international trade disputes.	CHAPTER VIII: DEALING WITH THE SOCIAL AND ECOLOGICAL IMPLICATIONS OF THE FOREST CRISIS	GOAL OF RECOMMENDATIONS: Mitigate the impacts of the forest crisis on communities by funding educational projects, community forests, Aboriginal engagement in forest development, and silviculture initiatives.



FOREWORD

We are honoured to present the final report of the Standing Senate Committee on Agriculture and Forestry titled “The Canadian Forest Sector: A Future Based on Innovation”.

The first part of this final report, which is largely based on the Committee’s interim report issued in December 2009, explores the causes and effects of the forest crisis in Canada. The second part is solution-focused and explores ways to increase the usage of wood in non-traditional markets while implementing a culture of continuous innovation in the industry.

We would like to acknowledge the remarkable analytical perspectives as well as the policy recommendations provided by witnesses at committee hearings. We are also grateful to all our colleagues that participated in this study. Their valued contribution has made this report possible.

Lastly, we would like to acknowledge the dedication of the clerks and analysts who have participated in the creation of this report.

Percy Mockler, Chair

Fernand Robichaud, P.C., Deputy Chair

EXECUTIVE SUMMARY

The Standing Senate on Agriculture and Forestry began an in-depth study of Canada's forest sector in the spring of 2009. The final report is based on the Committee's public hearings, held between April 2009 and December 2010. The Committee heard from a wide range of witnesses: government officials, the primary and secondary processing industry, private woodlot owners, architects and civil engineers, the bioenergy and bioproducts industry, academia and the research sector, environmental groups, Aboriginal communities and rural associations.

The final report consists of two parts. The first part explores the causes and effects of the forest crisis in Canada, considering the economic, social and ecological role of forests. It also describes the historical evolution of the federal government's roles and responsibilities in the forest sector. In recent years, all sectors of Canada's forest industry have declined: softwood and hardwood lumber production has declined significantly, as have pulp and paper and veneer and plywood production. This decline in production is largely due to the market forces and the resulting decrease in demand for Canadian wood products. The decline is both structural (e.g. drop in demand for newsprint due to growth of electronic publications) and cyclical (e.g.: decline in US housing market). The drop in demand is also attributable to stronger competition from Asian countries in the secondary processing sector, and from Brazil in pulp production. The other factors that have contributed to the current difficulties in the industry include the strong Canadian dollar, high energy costs, poor access to credit and US subsidies for its lumber industry.

The forest sector crisis has considerable economic, social and ecological implications. The falling demand for Canadian wood products has led to mill closures and massive layoffs. From 2000 to 2008, direct jobs in the forest industry declined by about 37%, for a loss of some 100,000 direct jobs. Behind these figures is considerable human hardship. There are about 200 communities in Canada that rely heavily on the forest industry. Finally, with respect to ecology, downward pressure on wood prices and profit margins becoming negative due to the economic downturn have an impact on forest management activities. Woodlot owners are in turn often forced to considerably scale back silviculture activities in order to reduce operating costs.

Although forest resources fall under exclusive provincial jurisdiction, the federal government has played a growing role in this sector over the years. The main areas of federal involvement are:

1. Research and development;
2. Sustainable development, ecosystem management and climate change;
3. Regional and community development;
4. Market and trade development.

The second part of the Committee's final report focuses on solutions to the problems identified in the first part. It must be recognized from the outset that the government cannot address all of the causes of the forestry crisis. For example, governments cannot revive demand for newsprint in North America or in the US housing market. The Committee chose instead to focus on realistic and pragmatic solutions such as looking for new markets for fibre from Canadian forests through a different usage of wood. There are significant opportunities for using wood in the construction of non-residential and multi-storey buildings. The forest sector must increase its market share in these value-added market segments. Doing so would make it possible to achieve two strategic objectives: decreasing the sector's dependency on basic products (such as the conventional "2 x4") and reducing its susceptibility to fluctuations in the US housing market. There are however cultural, institutional and regulatory barriers to the increased use of wood in commercial and multi-storey construction. The government can play a role in reducing or eliminating these barriers by ensuring that architects and engineers have appropriate training to work with wood materials and by making the National Building Code more flexible. Stronger marketing activities must also be a key part of the strategy to increase the market share for wood; this includes extending funding for wood-frame structure demonstration projects and programs such as North American Wood First, Wood WORKS!, and Canada Wood.

Energy production is also a promising market for sawmill by-products and low-quality wood and forest residues. This is particularly true in the context that demand for these by-products is in freefall due to the drop in pulp and board production. Government action to direct sawmill by-products and forest residues into energy use is risky however as it could lead to undue distortions in the forest sector, in particular for pulp and board producers. Moreover, the government should not hazard a guess on the winning energy solution of the future by directly subsidizing a specific energy source. The government should instead leave as much as possible to the normal interaction of supply and demand, while addressing market failures. A national fund for green energy and energy efficiency as suggested by the forest industry meets these criteria and warrants careful consideration by the government.

Any government policy to increase the use of wood in new market niches would be in vain unless the industry makes a major shift toward innovation. For several years, the forest industry's record on research, development and innovation has often been considered weak. For too long, the forest industry's competitive advantage has been based primarily on a low Canadian dollar and mass production of products with little value-added that are exported to the United States. The events of recent years have illustrated the major weaknesses of this model and the industry must now develop a culture of continuous innovation. The government's role in this regard should include the awarding of stable, long-term funding to FPInnovations, increasing innovation tax credits, creating an innovation venture fund for the forest sector, and contributing financially to the development of a national database on the lifecycle analysis of manufacturing products.

The proposed solutions to find new markets for Canadian wood products indirectly address the economic impact of the forestry crisis, such as plant closures and layoffs, but do little to address the social and ecological impacts of the crisis. This report

would not be complete without addressing these aspects. In order to mitigate the social effects, investments must be made in educational initiatives, community forest projects, and initiatives to enhance capacity building in Aboriginal communities with regard to forestry development. Regarding the ecological aspect, the government should create a federal-provincial forest resource development fund for silviculture initiatives (including elite silviculture) and for environmental certification and wood product traceability initiatives. The government must also adjust its support for forest management in keeping with the specific needs of private woodlot producers. This would mean establishing a personal silvicultural savings and investment plan for woodlot owners.

It should also be noted that even if the Committee's solutions can generally be implemented in the short term, it will take a number of years for their benefits to be felt. They are therefore important milestones to be reached in the positioning and long-term competitiveness of the Canadian forest industry.

LIST OF RECOMMENDATIONS

CHAPTER V

Recommendation 1 (page 47)

The Committee recommends that the Government of Canada promote a “wood first” culture among Canadians through education and outreach. To this end, the Committee recommends that the Government of Canada:

- in cooperation with the Council of Ministers of Education Canada, universities, technical colleges, the Engineering Institute of Canada and the Royal Architectural Institute of Canada, works to develop a mandatory course that would be dedicated to the use of wood as a building material in multi-storey non-residential and residential sectors;
- in cooperation with the Canada Research Chairs, the Natural Sciences and Engineering Research Council of Canada and Natural Resources Canada, work with Canadian universities and the forest industry to establish four multidisciplinary research chairs in the design and construction of wood buildings, to be located in the Maritimes, Quebec, Ontario and Western Canada; and
- through Natural Resources Canada and in cooperation with the Canadian Wood Council and Canadian universities, sponsor an annual or biennial international university wood structures competition for engineering, architecture and forestry students.

Recommendation 2 (page 51)

The Committee recommends that the Government of Canada maintains or increases funding to key programs that promote the use of wood in both residential and non-residential buildings. To this end, the Committee recommends that:

- Natural Resources Canada amend the North American Wood First initiative after the 2010-2011 fiscal year and renew it for a ten-year period. The program should maintain its funding for non-residential activities, and add a component targeting innovation in the multi-storey residential sector;
- The Government of Canada increase annual or multi-year financial support for *Wood WORKS!* (Cecobois) and the Canadian Wood Council. Funding granted should be based on tangible results; and

- Natural Resources Canada extend the wood demonstration projects initiative for a period of five years beyond the 2010-2011 fiscal year to target foreign markets as well as the Canadian market. For the Canadian market, the goal would be to have demonstration projects in every province and territory in Canada, and could include the use of wood in constructing recreational facilities such as hockey arenas and community centres.

Recommendation 3 (page 54)

The Committee recommends that Natural Resources Canada establish and fund a national round table on the value chain in the Canadian forest industry. The round table would serve as a discussion mechanism between the private, public and academic sectors in order to establish action plans on policy coordination, innovation and new market opportunities.

Recommendation 4 (page 56)

The Committee recommends that the Minister of Natural Resources explore, with the Department of Finance, the possibility of establishing a viable “Forest Credit Canada” to offset the lack of competition among chartered banks in certain market segments.

Recommendation 5 (page 59)

The Committee recommends that Natural Resources Canada extend the Canadian Wood program for another ten years (reviewable after five years) as of 2011 to enable Canadian forest product exporters to be more competitive on the global market.

Recommendation 6 (page 68)

The Committee recommends that the Department of Intergovernmental Affairs promote the issue of the harmonization of building codes across Canada at federal-provincial ministerial meetings, to facilitate the increased use of wood in the residential and non-residential multi-level construction sector, and remove restrictions on the use of wood.

Recommendation 7 (page 75)

The Committee recommends that, by 2015, the Minister of Industry, through the National Research Council Canada:

- conduct or subcontract research work and validate international technical research to make the necessary information available to architects, engineers and construction professionals for the construction of multi-storey wood-frame buildings of more than four storeys; and
- foster a consensus among provincial and territorial partners to amend the National Building Code to permit the construction of multi-storey wood-frame buildings to a maximum height of seven storeys.

Recommendation 8 (page 81)

The Committee recommends that, by 2015, the Minister of Industry, through the National Research Council Canada, foster a consensus among the various advisory committees on the addition of a fifth objective to the National Building Code. This objective would concern the environmental footprint of residential and non-residential buildings and focus on:

- a) Increasing energy efficiency by integrating the standards of the Model National Energy Code of Canada for Buildings (MNECB) into the National Building Code; and
- b) Reducing greenhouse gas emissions.

CHAPTER VI

Recommendation 9 (page100)

The Committee recommends that Natural Resources Canada establish a national fund for innovative green energy and energy efficiency. The guiding principles of this fund would be universality, shared financial responsibility between public and private sectors and strict management of costs.

CHAPTER VII

Recommendation 10 (page 119)

The Committee recommends that the Government of Canada:

- ensure that FPIInnovations has access to long-term government funding;
- enhance targeted tax credits so as to encourage more innovation by Canadian businesses, in particular those in the forest sector, on the basis of technology content and environmental benefits;
- maintain a fiscal environment that encourages investment in and adoption of advanced technologies in the Canadian forest sector, in particular through federal policies regarding accelerated write-off of investments in capital equipment and customs duties on imports of such equipment; and
- through Natural Resources Canada and in collaboration with the Business Development Bank of Canada, establish an “Incubation Fund for Innovation in the Forest Sector” for the purpose of sharing risk with the industry through the “Valley of Death” in order to increase the availability of capital for start-up businesses and for innovative technologies in the forest sector.

Recommendation 11 (page 122)

The Committee recommends that the federal government defray 34 per cent of the costs for a value not exceeding \$5 million in a public/private partnership to develop a database of life-cycle assessments of manufactured products, for use in Environmental Product Declarations.

CHAPTER VIII

Recommendation 12 (page 127)

The Committee recommends that the Government of Canada through Natural Resources Canada continue to fund the Forest Communities Program for an extended five-year period. The Committee further recommends that funding to the Canadian Model Forest Network be maintained at its current level.

Recommendation 13 (page 128)

The Committee recommends that the Canadian Forest Service and the Canadian Council of Forest Ministers work with the Canadian Tourism Commission to promote forest-based tourism opportunities.

Recommendation 14 (page 129)

The Committee recommends that the Government of Canada, through the Canadian Council of Forest Ministers, work with provinces and territories to communicate and educate the public on the importance of the forest sector, while showcasing its innovative and sustainable character.

Recommendation 15 (page 131)

The Committee recommends that the Government of Canada, through the Canadian Council of Forest Ministers, work with provinces and territories to support capacity-building initiatives and develop innovative institutional arrangements for Aboriginal communities in areas such as education, training, and business development.

Recommendation 16 (page 137)

The Committee recommends that Natural Resources Canada create a joint federal-provincial/territorial forest resources development fund for silviculture activities (including elite silviculture plantations). This fund should also finance environmental certification and wood products traceability initiatives.

Recommendation 17 (page 138)

The Committee recommends that Natural Resources Canada, in partnership with the provinces and universities, sponsor the creation of a university research centre dedicated to hardwood silviculture in the Maritime region.

Recommendation 18 (page 140)

The Committee recommends that Natural Resources Canada work with the Department of Finance to implement a Personal Silvicultural Savings and Investment Plan for private woodlot owners in order to enhance their best management practices.

THE CANADIAN FOREST SECTOR

A Future Based on Innovation

INTRODUCTION

Forests are ecologically, socially and economically vital to Canada. Ecologically, they filter and purify water, clean the air through carbon storage and provide a habitat for wildlife. Socially, they offer recreational sites for outdoor activities such as hiking, camping and hunting. They are also sources of spirituality and sustenance for First Nations, and contribute to the vitality of rural areas.

Economically, forests are primarily a resource to be developed for financial gain. Many factors underlie the forest crisis that has been ravaging Canada for several years. However, these crises all share certain characteristics: plant closures, job losses and weakened rural communities. The current crisis is tied mainly to the economic role of forests, which has received significant media attention. However, we cannot consider the economic role in isolation, since all three primary roles are in constant interaction.

Part I of this report examines the causes and effects of the forest crises, taking into account the forest's economic, social and environmental dimensions. Chapter I provides an overview of the role and historical importance of Canada's forests. Chapter II examines the causes of the crisis in the forest system and Chapter III looks at the repercussions. Part I concludes with Chapter IV, which provides an overview of the federal government's historical roles and responsibilities.

Drawing on the issues identified in the first section, Part II offers possible solutions, grouped into four sections, with a chapter devoted to each. Chapter V recommends ways to remove cultural, institutional and regulatory barriers to the increased use of wood as a building material. Chapter VI makes recommendations to the federal government on promoting the increased use of forest biomass in energy production. Chapter VII contains recommendations to the federal government on helping the forest industry become more active in research, development and innovation.

Lastly, in an effort to seek solutions, the report also looks at ways to mitigate the effects of the forest system crisis on communities and long-term forest productivity. Chapter VIII makes recommendations on silviculture, certification and community involvement.

PART I

**PROBLEMS FACING THE FOREST SYSTEM AND
HISTORICAL OVERVIEW OF THE FEDERAL
GOVERNMENT'S ROLES AND RESPONSIBILITIES**

CHAPTER I: THE CANADIAN FOREST: A HISTORICAL OVERVIEW AND SYSTEMIC APPROACH

1. A Brief Overview of the Significance of Forests in Canadian History

Forests are intrinsically linked with Canada's history. Long before the arrival of European settlers, the forest played a fundamental role in the lives of the First Nations peoples: it was a source of sustenance, supplying them with primary materials and meeting some of their basic needs, such as food, lodging and clothing. For example, some First Nations used the paper birch tree to build their famous canoes. The bark of the paper birch—also called canoe birch—was placed over a frame built of *Thuja occidentalis* wood that had been shaped with steam. The birch bark was sewn together using spruce, pine or larch roots and was waterproofed with pitch from conifers (spruce, pine).

Several First Nations also used bark from the paper birch for building shelters (wigwams), weaving baskets and as writing materials. They also used many trees for medicinal purposes. For example, the leaves and bark of the *Thuja occidentalis*—commonly but incorrectly known as “cedar”—were used for infusions and ointments to treat coughs, swelling and burns. Jacques Cartier was very likely referring to the *Thuja occidentalis* when he mentioned the “annedda” in his travel journals as the tree that saved his men from death by scurvy.¹

They showed us how to grind the bark and the leaves and to boil the whole in water. Of this one should drink every two days, and place the dregs on the legs where they were swollen and affected. According to them this tree cured every kind of disease. They call it in their language Annedda.

The Captain at once ordered a drink to be prepared for the sick men but none of them would taste it. At length one or two thought they would risk a trial. As soon as they had drunk it, they felt better which must clearly be ascribed to miraculous causes; for after drinking it two or three times, they recovered health and strength and were cured of all the diseases they had ever had. [...] Then there was such a press for the medicine that in less than eight days a whole tree as large and as tall as any I ever saw was used up [...]

Not surprisingly, the *Thuja occidentalis* is also known as the arborvitae, or “tree of life.” Spruce gum, used to make the famous spruce beer, eventually became a preferred source of essential vitamins and minerals for French settlers. The shagbark hickory and the yellow birch were highly valued for cabinetry in New France.

¹ *The Voyages of Jacques Cartier*, University of Toronto Press, 1993, p. 80.

During the same period, maple was used for heating homes and, of course, for making maple syrup. The hemlock was used to build barns and railroad ties, and for a long time it was the preferred source for tannic acid used to process leather. The eastern white pine is closely linked to the development of the logging industry. In the 19th century, white pine was the British Navy's wood of choice for shipbuilding. In 1806, the first timber rafts were sent down the Gatineau River.

The jack pine is the pine with the largest geographical distribution in Canada. Its habitat extends from Nova Scotia to the Northwest Territories. Today, the species is highly valued as it is used in a number of commercial applications (softwood lumber, pulp and paper). For a long time, however, it had the unenviable reputation among settlers of "poisoning the land" given that it is often associated with poor soil conditions. The jack pine is a close relative of the lodgepole pine from British Columbia, whose population is currently being ravaged by the mountain pine beetle. These two species of pine often produce hybrids where they co-exist. The jack pine and lodgepole pine were called "cypress" by early French Canadian explorers and Métis. This explains the origin of the name "Cypress Hills" in Southern Alberta and Saskatchewan.

Ash was the preferred wood for hockey sticks, a Canadian sports symbol par excellence if ever there was one. The Manitoba maple was used for shade trees and shelterbelts in the Prairies and is used today for revegetation and stabilizing riverbanks. Spruce and fir are associated with the development of the pulp and paper industry, and of course, the fir is also the Christmas tree of choice. The construction industry uses large quantities of spruce, fir and pine. Long considered an undesirable species, the poplar has become widely used over the last 25 years for commercial purposes including plywood, and pulp and paper. The trembling aspen, a variety of poplar, is a preferred tree of the beaver both as a food source and as building materials for their dams and lodges.

This brief overview of some of the ways in which trees have been used in Canadian history² illustrates the many roles the forest plays in Canada. Of course, the manner in which forest resources are used has changed radically over the years, but Canada's forests are still called on to fill important social, economic and ecological roles.

2. The Canadian Forest: A Systemic Approach

The diagram in Figure 1 shows the main components of the Canadian forest system. The image as a whole represents the entire forest ecosystem. The sub-systems of the forest ecosystem are closely linked. In order for the entire ecosystem and its components to prosper, there must be a balance between these sub-systems.

If too much emphasis were placed on the economic aspect of forest production, the forest's ecological role would suffer. At the same time, the loss of virgin forest space

² Some of these historical anecdotes were taken from *Guide d'identification des arbres du Canada*, (Jean Lauriault) Musées nationaux du Canada, Broquet, 1987, 551 pages.

would ultimately have an impact on the economic vitality of rural communities, thereby affecting the forest's social role as well.

A first principle to remember: all forest policies must seek to achieve a balance between the three main roles of the forest. Granted, Canada's forest policies over the years have probably not always met this objective, but it is estimated that this principle enjoys a large consensus among stakeholders more so today than ever.

We should think about the big and small companies as an economic ecosystem. They depend upon each other. We need the woodlot owners; they need the big companies. [W]e need many more small, value-added companies; the niche players, the agile players, and the big, world-class heavy hitters. If they are all functioning, everyone prospers. If you take out one piece of the economic ecosystem, the whole ecosystem shakes.

Avrim Lazar, President and CEO, Forest Products Association of Canada

Given the predominance of current economic problems, the diagram in Figure 1 places special emphasis on the economic role of the forest. Note that only the forest's *direct* economic role is shown. The forest also has a very important *indirect* economic role, given the numerous industries that depend on forest products or that supply the forest industry.

The sub-sectors of the forestry industry are in constant interaction within this economic framework, right from the moment a tree is cut down, as different parts of the tree serve different purposes.

A second principle to remember: the sub-sectors of the forestry industry are often complementary. For example, wood chips, a by-product of lumber production, can be used by pulp producers. Sawing and sanding operations produce large quantities of sawdust that can be used to make particle board. Bark is another industry by-product and can be used as an energy source within the forest sector.

A third principle to remember: there are many alternative uses for by-products of primary and secondary processing, which can create competition between users or lead them to integrate vertically to control access to raw materials (e.g., a pulp mill buys a sawmill to control its supply of wood chips).

Even if the sub-sectors of the forestry industry are often complementary, the same by-product could have multiple uses. Operations may thus compete for access to these by-products. For example, the wood chips produced by sawmills may be in demand from both oriented strand board producers, and pulp companies.

Similarly, sawdust can be used by pulp producers and particle board companies, and even has some usefulness outside the forestry industry, e.g., as bedding for farm animals. As a general rule, by-products of the forestry industry can also be used for energy production (e.g., wood pellets for fuel).

It is extremely important to understand the relationships between the elements described in the previous section and illustrated in Figure 1 when examining the causes of and possible solutions to the forest system's current problems. These relationships mean that a decrease in demand for one type of wood product is liable to affect other sub-sectors of the forest industry. In the same way, every government assistance policy for a specific sector will likely have an effect—negative or positive—on the other sectors of the system.

Sources of material for Figure 1:

Economic role diagram: based on the presentation by the New Brunswick Federation of Woodlot Owners before the Committee

Images: Images Nova Scotia, “Indian Canoe and Wigwam” Watercolour, Anonymous, Collection of the Nova Scotia Museum of cultural History, <http://museum.gov.ns.ca/imagesns/html/21732.html>

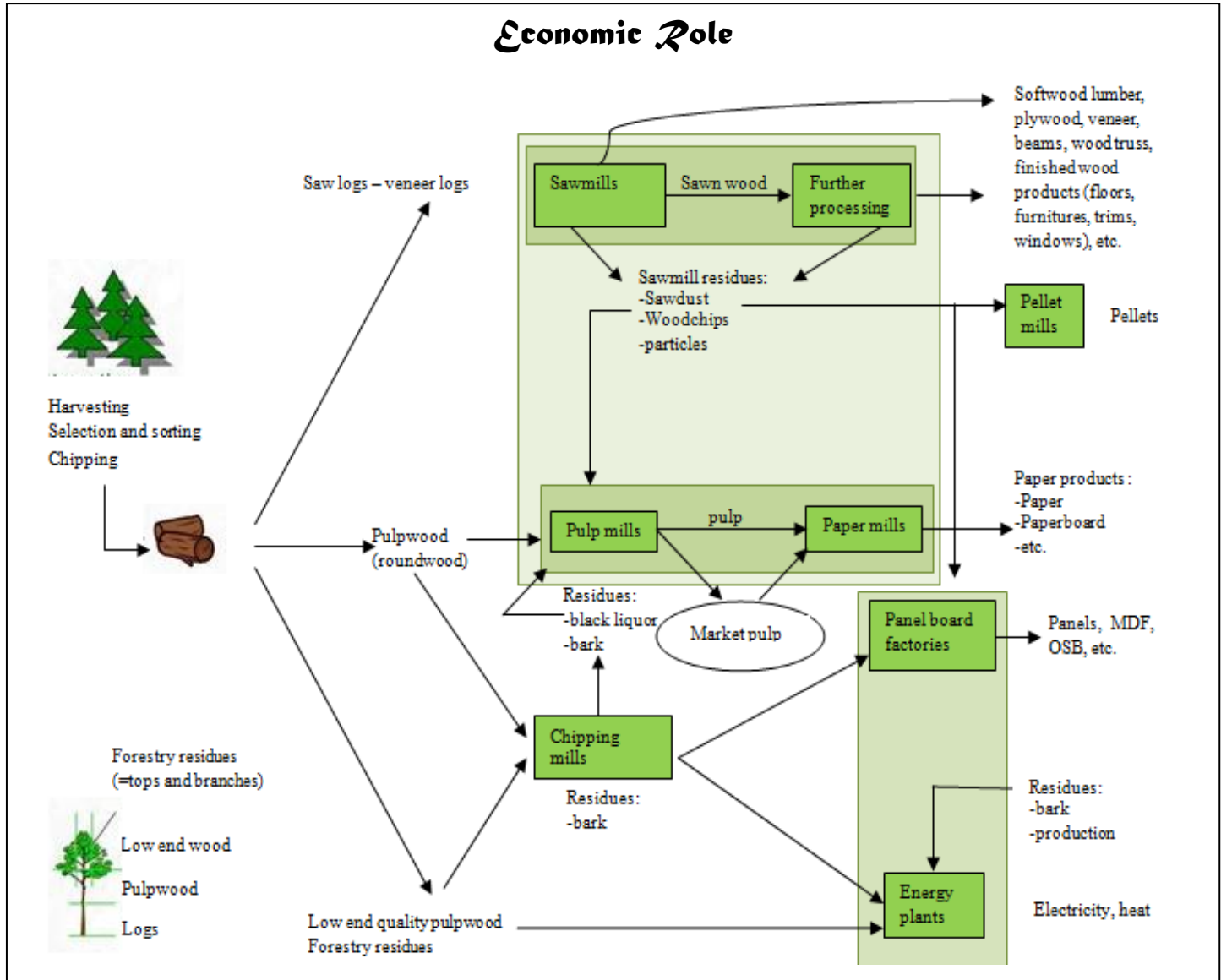
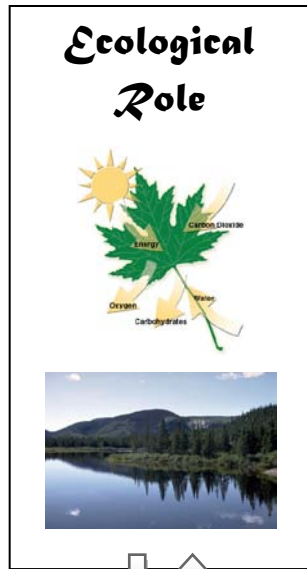
Natural Resources Canada (<http://scf.rncan.gc.ca/index/education3/?lang=en>)

Canada's Economic Action Plan (<http://www.plandaction.gc.ca/eng/media.asp?id=1809>)

Schematic: Parliamentary Information and Research Service, Library of Parliament.

Figure 1 – The Canadian Forest System

The Forest System



CHAPTER II: THE CAUSES OF THE CRISIS IN THE FOREST SYSTEM.

My first comment would be that we should be discussing crises within the forest sector and not just a crisis. There are a number of crises for which explanations differ.

Jean-Pierre Dansereau, Director General, Fédération des producteurs de bois du Québec

The current problems in the forest system can be explained largely by the decreased demand for products made of Canadian wood, although the reasons for the reduction in demand vary from one product to another. The strong Canadian dollar, limited access to credit and timber supply are among the factors that have exacerbated the problems caused by shrinking markets.

One challenge related to market loss is to understand why the industry's very structure made it so susceptible to the decrease in demand for primary products. The following sections will examine these three aspects.

1. The causes of the Forest System Crisis

a) Structural Decline in Demand for Newsprint

Take the newsprint sector, which is a traditional market. Despite the high quality of paper manufactured in Quebec, which is based on the quality of black spruce fibre, the market for this product is shrinking. It is going down by about 8 per cent per year.

Yves Lachapelle, Forestry Director and Special Adviser, Strategic Issues, Quebec Forest Industry Council

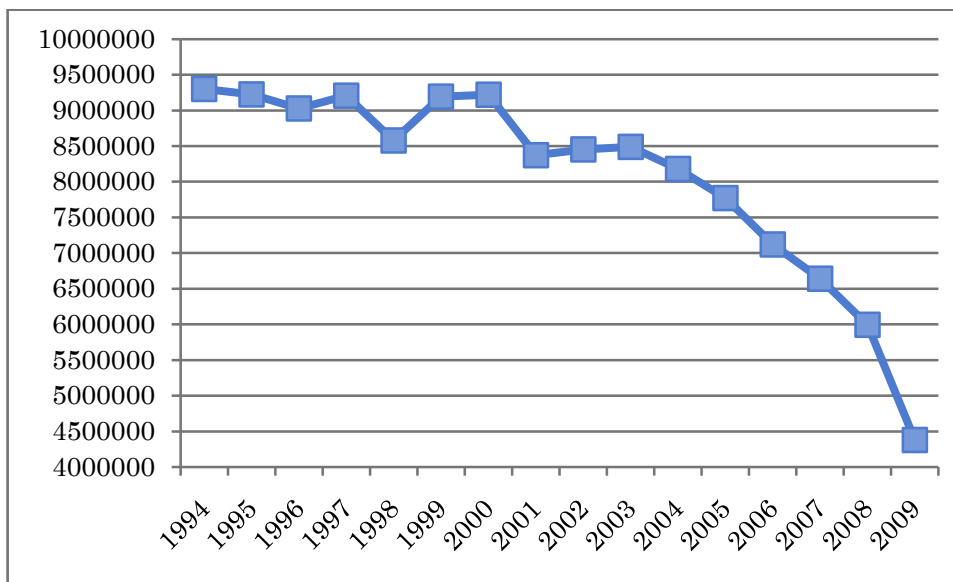
[...] people are switching from classified advertisements to Craigslist — and they will not come back.

Avrim Lazar, President and CEO, Forest Products Association of Canada

The demand for newsprint is in serious decline in North America, with the sharpest decrease occurring in the last few years. The main reason for this decrease is the popularity of the Internet and electronic publications. With fewer newspapers being sold, the demand for newsprint has been reduced, which has created huge problems for companies and workers in the Canadian pulp and paper industry.

The following graph depicts newsprint production in Canada between 1994 and 2009, clearly showing that production is in severe decline. It is important to note that this decline is more structural than cyclical - that is - most of the decrease can be attributed to an irreversible trend: the increased popularity of online and electronic publications. This is not to say that the decline will continue at the same rate as it has in the last few years. Nevertheless, there is a large consensus that the newsprint market will never again reach the peak it achieved in the 1970s and 1980s in North America.

Graph 1- Newsprint Production in Canada (tonnes)



Source: Canada's Forests, Natural Resources Canada, <http://canadaforests.nrcan.gc.ca/statsprofile/production>

There is much discussion concerning the fierce competition from Brazil for pulp³ production. However, this competition is not a factor in the decline of newsprint production. In fact, Brazilian newsprint production has plummeted 40 per cent in the last decade, unlike Chinese newsprint production, which has skyrocketed in the same timeframe. This increase in Chinese newsprint is due to domestic

³ Pulp is a material prepared by chemical or mechanical separation of fiber from wood. Wood pulp can be produced from [softwood](#) trees such as [spruce](#), [pine](#) and [fir](#), and from [hardwoods](#) trees such as [eucalyptus](#), [aspen](#) and [birch](#). Pulp is the raw product used in the paper making process.

consumption; more than 90 per cent of Chinese newsprint was consumed domestically in 2008.⁴

b) Decreased Demand due to Competition from Developing Economies

Pulp and paper

The demand for pulp has not experienced the same decline that newsprint did. In fact, demand has been relatively strong because of global economic growth over the last 10 years. The problems that Canadian pulp producers face can be explained mostly by increased competition from developing countries. For example, Brazil increased its pulp production by 150 per cent between 1994 and 2009.⁵

In Brazil, and in developing countries in general, pulp is often made from fast-growing trees (e.g., eucalyptus) on plantations located close to very large processing facilities. The average distance between tree plantations and the factory might be as little as 100 km. Also, the quantity of eucalyptus grown per hectare in Brazil is phenomenal. The eucalyptus can reach maturity in seven years, while Canadian species such as the Douglas fir and the eastern spruce take 45 and 90 years to mature, respectively.⁶

This rapid tree growth allows Brazilian processing plants to avoid having to go farther and farther away to maintain their timber supply, which has been the case with Canadian pulp companies. This production advantage, along with technological innovations, has allowed developing countries to rapidly become key players in the pulp production market, thereby presenting a definite threat to North American producers.

Graph 2 shows printing and writing paper production in Canada. As the graph illustrates, printing paper production in Canada has fallen drastically since its peak in 2004. It should be noted that the emerging popularity of e-books could also represent an important challenge to Canadian printing paper producers in the future.

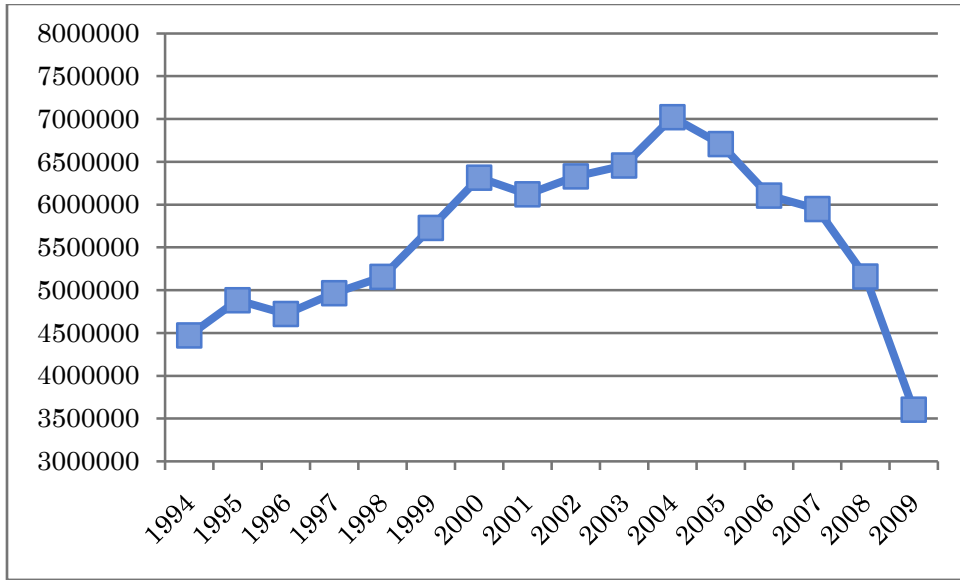
Graph 3 compares Canadian and Brazilian pulp production. Despite Brazil's dramatic increase in pulp production, the graph demonstrates that Canada still produces more pulp. The question is - for how much longer?

⁴ Source: http://0101.netclime.net/1_5/2fb/148/215/China%20Newsprint.pdf .

⁵ Brazilian Pulp and Paper Association (Bracelpa), <http://www.bracelpa.org.br/eng/estatisticas/index.html> .

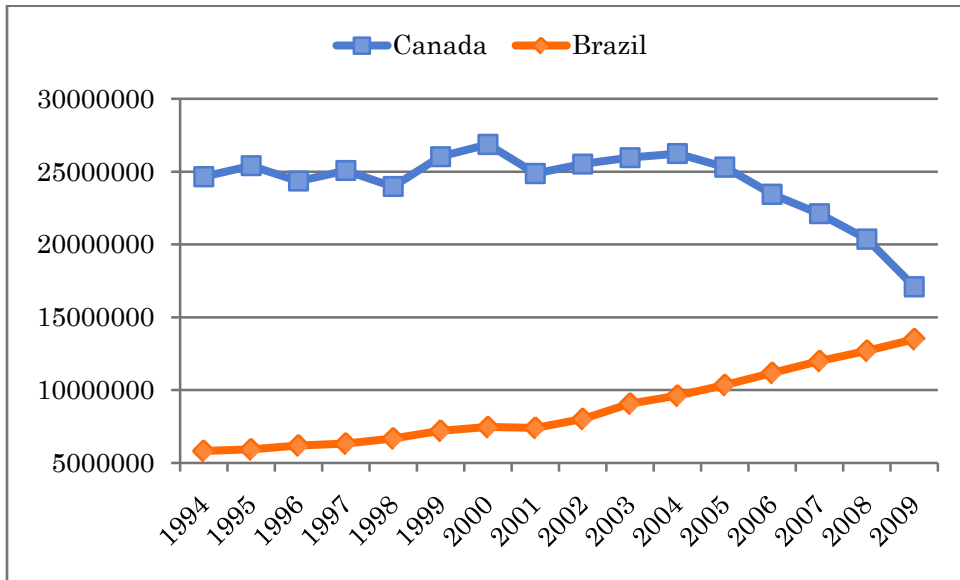
⁶ *The Case for Brazil*, Perry J. Greenbaum, September 1, 2008, Pulp & Paper Canada.

Graph 2 - Printing and Writing Paper Production in Canada (tonnes)



Source: Canada's Forests, Natural Resources Canada,
<http://canadaforests.nrcan.gc.ca/statsprofile/production>

Graph 3 - Pulp Production in Canada and Brazil (tonnes)



Source: Canada's Forests, Natural Resources Canada,
<http://canadaforests.nrcan.gc.ca/statsprofile/production>
 Brazilian Pulp and Paper Association (Bracelpa),
<http://www.bracelpa.org.br/eng/estatisticas/index.html>
 Compilation: Parliamentary Information and Research Service, Library of Parliament

Secondary processing industries

The secondary processing industries have also faced competition from Asian producers. China has replaced Canada as the leading exporter of furniture to the United States with 50 per cent of market share, leaving Canada a distant second with only 14 per cent of market share. Furniture made in Asia also accounted for more than 50 per cent of Canadian domestic demand in 2007.⁷

Although the Canadian kitchen cabinet industry was a growing industry before the economic recession, Asian producers now have a foothold in the market for lower-end products. Secondary processing industries, like furniture and kitchen cabinets, buy significant amounts of panels and veneers, which means that when these industries are in trouble, the primary processing industries are negatively affected as well.

Sawmills

The sawmill industry has also been affected by the problems facing pulp and panel board producers. Sawmills produce by-products such as wood chips and sawdust that are consumed in large quantities by pulp and panel board producers. Veneer companies use only 25 per cent of a tree's fibre, and the rest must be sold for producing pulp, panels, wood pellets, etc. Therefore, when paper and panel board producers faced problems, certain sawmills suffer financially as a result.

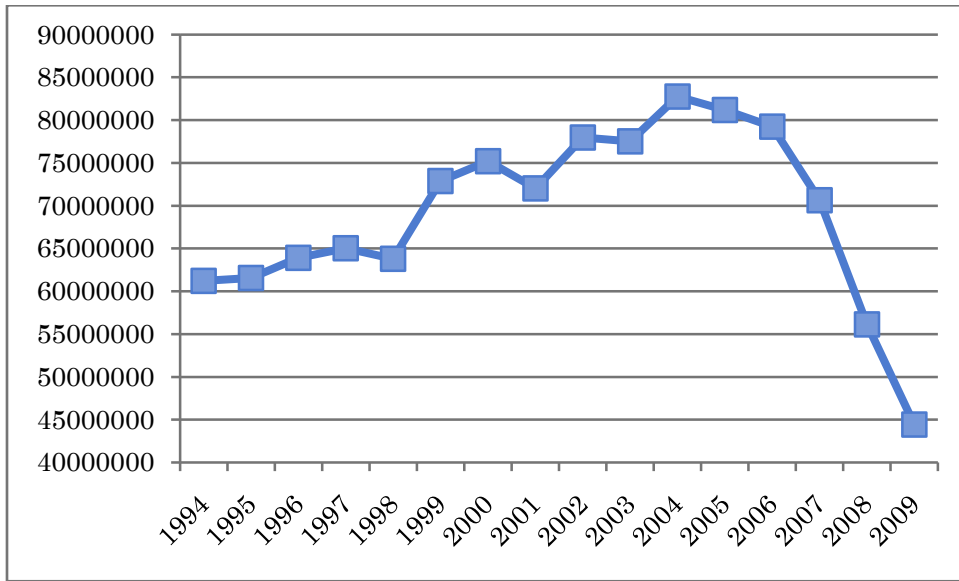
c) Cyclical Decrease in Demand from the Construction Industry

While pulp production had been stagnant or in decline in Canada since the mid-1990s, until very recently the construction lumber industry was still growing, despite the softwood lumber dispute with the United States. When the real-estate bubble burst in the United States and residential construction collapsed, Canadian sawmills were seriously affected.

The decrease in construction had an immediate effect on primary processing products (plywood, framing lumber, oriented strand board, etc.) as well as secondary processing products (kitchen cabinets, flooring, windows, etc.). The collapse of the housing market occurred at a time when sawmills were already facing a decreased demand for their by-products (wood chips and sawdust) due to the decline of the pulp industry.

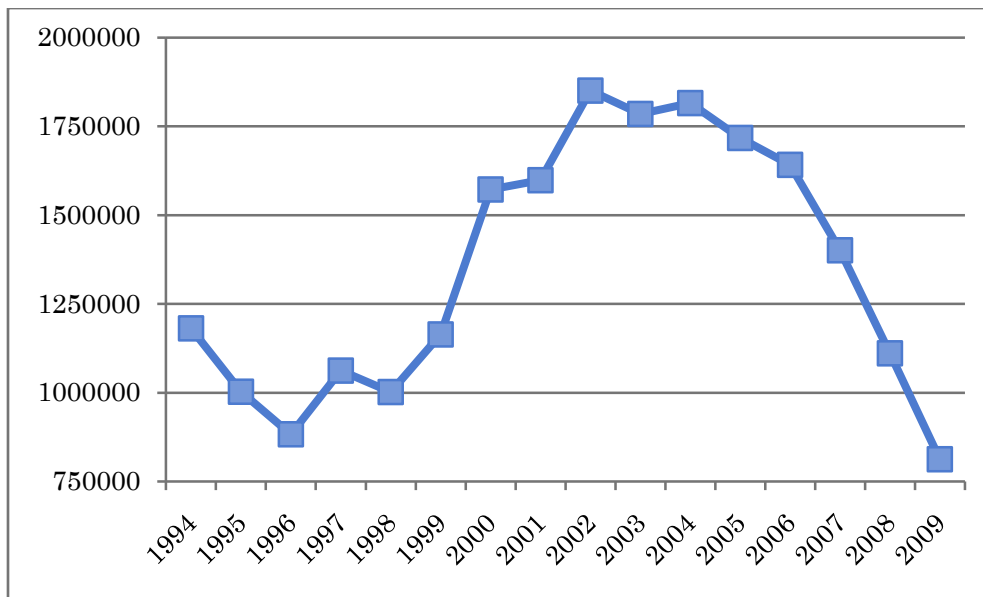
⁷ Terry Clark, President, Canadian Council of Furniture Manufacturers, statement before the committee, May 28, 2009.

Graph 4 - Production of Softwood Lumber in Canada (cubic metres)



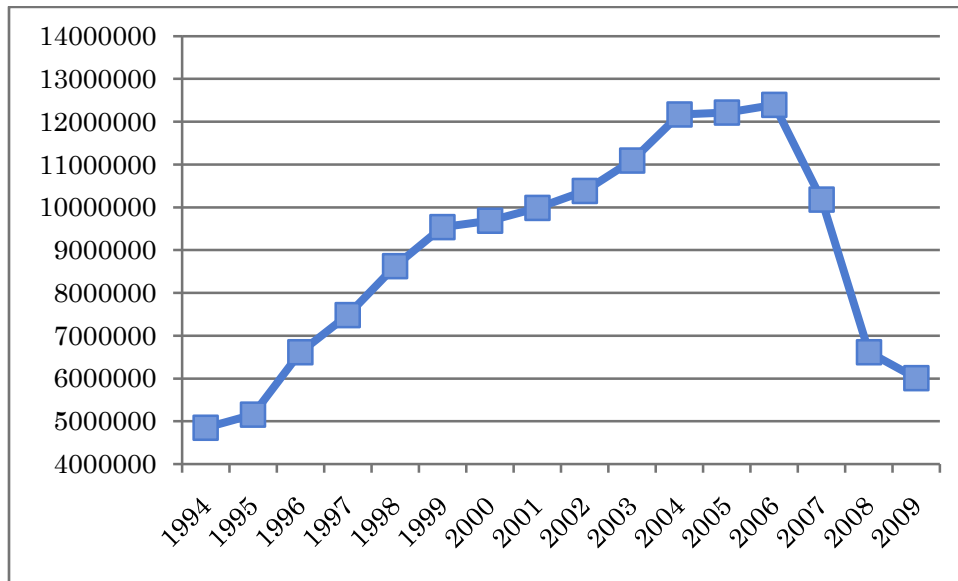
Source: Canada's Forests, Natural Resources Canada,
<http://canadaforests.nrcan.gc.ca/statsprofile/production>

Graph 5 - Production of Hardwood Lumber in Canada (cubic metres)



Source: Canada's Forests, Natural Resources Canada,
<http://canadaforests.nrcan.gc.ca/statsprofile/production>

Graph 6 - Production of Plywood and Oriented Strand Board (cubic metres)



Source: Canada's Forests, Natural Resources Canada,
<http://canadaforests.nrcan.gc.ca/statsprofile/production>

Graphs 4 and 5 show the production of softwood and hardwood lumber in Canada between 1994 and 2009. Graph 6 shows the production of plywood and oriented strand board (OSB). These three graphs highlight the sharp decline in sectors associated with the construction market. This decline can be said to be “cyclical”, because residential construction in the United States is seen as a cyclical business. However, given the excess that marked the recent real-estate boom in the United States, the trough of this cycle could last for longer than previous experiences would suggest.

We have gone from a peak of about 2.2 million housing starts down to 600,000. That is a 75 per cent drop in demand. (...) [Prices] have gone from over \$400 a unit to \$190 a unit; a 50 per cent decline. By simple calculations, a 50 per cent decline in volume and a 50 per cent decline in price results in 25 per cent of business remaining. Not many industries can survive at those rates, which is why today we see both permanent and temporary layoffs as well as closures.

Bill Love, Chairman of the Board, Canadian Wood Council

d) Aggravating Factors

Regarding currency fluctuations, the higher the Canadian dollar, the higher its position on the hurdle list.

Russ Cameron, President, Independent Lumber Remanufacturers Association

There are numerous aggravating factors that have impacted the forest sector in recent years. They include:

- *Exchange Rate and the Cost of Energy;*
- *Access to credit;*
- *Black liquor; and,*
- *Timber supply.*

Each is discussed in more detail below.

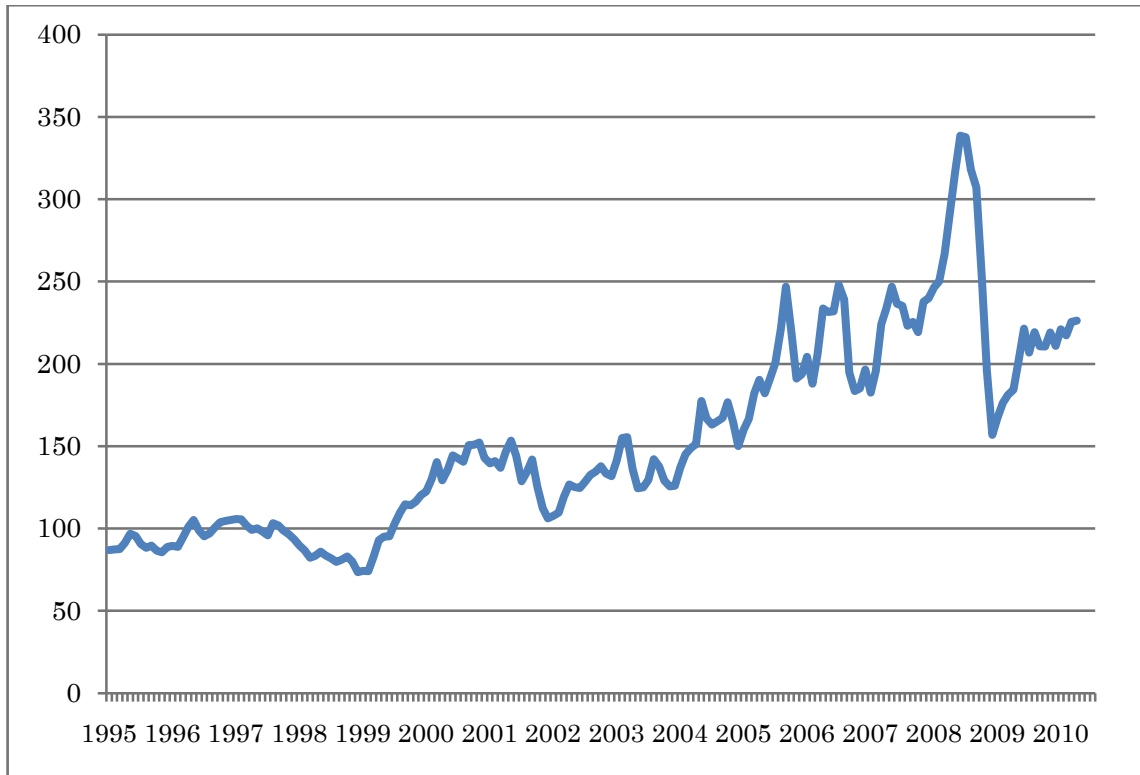
i) Exchange Rate and the Cost of Energy

The strength of the Canadian dollar over the last few years has exacerbated the forest industry's problems. As commodity prices are determined in U.S. dollars, any increase in the Canadian dollar compared with the U.S. dollar results in a direct decrease in price for Canadian producers. Some costs, such as salaries, are not influenced by the fluctuating exchange rate. Therefore, the profit margin for Canadian companies is often caught between an increase in the Canadian dollar and normal operating costs.

Similarly, rising energy costs over the last few years (see Graph 7) have also exacerbated the crisis, as the forestry industry consumes a lot of energy. The combination of a strong Canadian dollar and elevated energy costs has greatly affected the financial health of some companies.⁸

⁸ It is important to note that the combination of a strong Canadian dollar and high energy costs is not a coincidence. There has been historically a certain correlation between the two factors.

Graph 7 - Evolution of Monthly Gasoline and Fuel Oil Prices since 1995 (industry price index, 1997=100)



Source: CANSIM, v1574558; Gasoline and fuel oil, other, industry price index.

ii) Access to Credit

We have been considered a high risk [industry] for several years now, and the expanding credit crisis is wreaking havoc. As companies scramble to cover debt in these difficult times, financial institutions are unwilling to lend at normal risk premiums, and in the rare chance that they do invest, it is usually at extremely high premiums, from 8 to 15 per cent. This makes it very difficult to look at any innovation, any new ideas, any new markets or any new product.

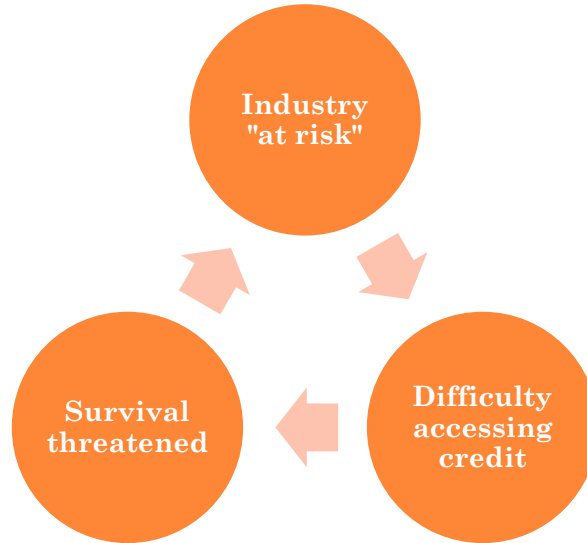
Mark Arsenault, President and CEO, New Brunswick Forest Products Association

Even before the economic crisis, the forest industry was seen as an industry at risk and therefore had restricted access to credit compared with other sectors in the economy. With the financial crisis, banks have become even more cautious in their lending policies, and forest



companies have had even less access to credit than before⁹. Many forestry companies have found themselves in a vicious circle that threatens their very survival, as pictured in Figure 2.

Figure 2 – The Vicious Circle of Access to Credit for Forest Companies



Source: Parliamentary Information and Research Service, Library of Parliament.

iii) Black Liquor

The U.S. black liquor tax credit further aggravated the situation of Canadian pulp producers. Black liquor -a by-product of the kraft process- has a high energy content, and is therefore reused in the pulp-making process to create steam. Since black liquor is considered a biofuel in the United States, it is currently eligible for a substantial tax credit. This credit can cover up to 50 per cent of production costs, which gives U.S. producers an unfair advantage.¹⁰

⁹ Government entities such as Export Development Canada (EDC) and the Business Development Bank of Canada (BDC) have also expressed their views at Committee hearings on the risks pertaining to access to credit for the forest industry. This issue is discussed in greater detail in Chapter 4.

¹⁰ This issue is addressed again later in this report. The federal government has implemented a green credit for black liquor production in Canada to lessen the effects of the U.S. tax credit.

iv) Timber Supply

(...) the remoteness and inaccessibility of our mature softwood forests [in Quebec]; the dispersion of pine and deciduous growth in our deciduous forests [...]

Yves Lachapelle, Forestry Director and Special Advisor, Strategic Issues, Quebec Forest Industry Council

(...) we are optimistic that the industry will recover, and when it does, we will have a wood supply problem again.

Tom Reid, Deputy Minister, Department of Natural Resources of New Brunswick

Although Canada is a nation known for its vast forests, it may seem surprising to note that another factor contributing to the forest crisis is that of timber supply. Indeed, manufacturers in Eastern Canada are at a distinct competitive disadvantage due to the small stature of the trees and their relatively remote location.

Furthermore, increasing energy costs add to the burden for forest companies struggling with the distance between the timber source and the processing location. It is worth noting that these trees were at one time larger and closer to the processing location. The change in circumstances may be a testament to poor forest management in the past.

In British Columbia, and to a lesser extent Alberta, the mountain pine beetle infestation has destroyed huge swaths of forest. The pine beetle attacks various species of pine, including the lodgepole pine, the most commercially exploited species in British Columbia. According to Natural Resources Canada, at the rate the mountain pine beetle is currently spreading, 80 per cent of mature pine trees in British Columbia will have died by 2013.

Pine trees in Canada's northern boreal forest, especially the jack pine, are also at risk. Paradoxically, this epidemic has led to an increase in the quantity of fibre available in the short term, because even once a pine tree has been attacked by the pine beetle, it retains its commercial value for a few years. However, this potential increase in supply comes at a time when demand is in freefall. Beyond the short term, it is estimated that the infestation will negatively affect timber supply in the West for a very long time.

e) Industry Structure

The forest industry finds itself in an unfortunate situation, which could probably have been avoided if the industries' sectors and companies had had a broader long-term vision, extending beyond immediate concerns.

Guy Caron, National Representative for Special Projects, Communications, Energy and Paperworkers Union of Canada

I believe the main cause of the existing crisis is the fact that we have not adapted quickly to the new economic realities of the global economy. [...] We have not tried very hard to diversify out of our low-value, commodity-based products. We simply have not set our sights very high.

Tom Beckley, University of New Brunswick, Faculty of Forestry and Environmental Management, as an individual

A lack of diversity in the forest sector is the major cause of the current vulnerabilities. Natural resource management policies and practices that focus on primary producers have created a dependency relationship between communities, industry and government.

Joseph LeBlanc, student, Northern Ontario Community Economic Development Network

Why did industry not act more determinately when it had more options? In the 1970s, and even the 1980s, it had the capital, leadership and technological prowess to go forward and provide a stronger foundation for itself, but it did not do this. [...] In retrospect, it appears that their assessment of risk and reward of various investment alternatives was flawed because they were heavily dependent on Canada and on the U.S. market. There was also some complacency because the industry had been dominant for so long and they had it so good that they did not see that things had fundamentally changed.

Jeremy Williams, Forestry Consultant, Registered Professional Forester in Ontario, as an individual

Witnesses appearing before the Committee often cited the following elements as major contributors to a weakened Canadian forest industry:

- **excessive reliance on the U.S. market;**
- **an industrial structure that is concentrated, integrated and focused mainly on primary products;**
- **the lack of diversity in the manufacturing sector; and**
- **out-of-date manufacturing facilities suffering from a lack of reinvestment.**

The weakened state of the industry had been hidden for many years by a low Canadian dollar, low energy costs and a relatively healthy demand for products made from Canadian wood. Once these factors were reversed, the industry's inherent weaknesses were revealed, creating a systemic crisis. The structure of the industry at the start of this crisis can be explained by a variety of reasons. They likely stem from a combination of historical factors, such as an inflated sense of confidence in the future given the relative prosperity the industry had experienced for years, public policies that did not adapt to the new reality, and poor business decisions.

The debate over what led to the current industry structure could go on forever. What should be retained is that the industry displayed traits, mainly a lack of diversity in its products and export markets, as well as a degree of concentration that made it vulnerable to significant changes in economic conditions. While this observation applies mostly to the pulp and paper business, many companies have both sawmill and pulp activities, making it sometimes difficult to distinguish between these two sectors.

CHAPTER III: THE EFFECTS OF THE CRISIS IN THE FOREST SYSTEM

The effects of the forest crisis are serious and widespread, with significant economic, social and ecological implications for communities across the country. The following sections examine these implications in turn

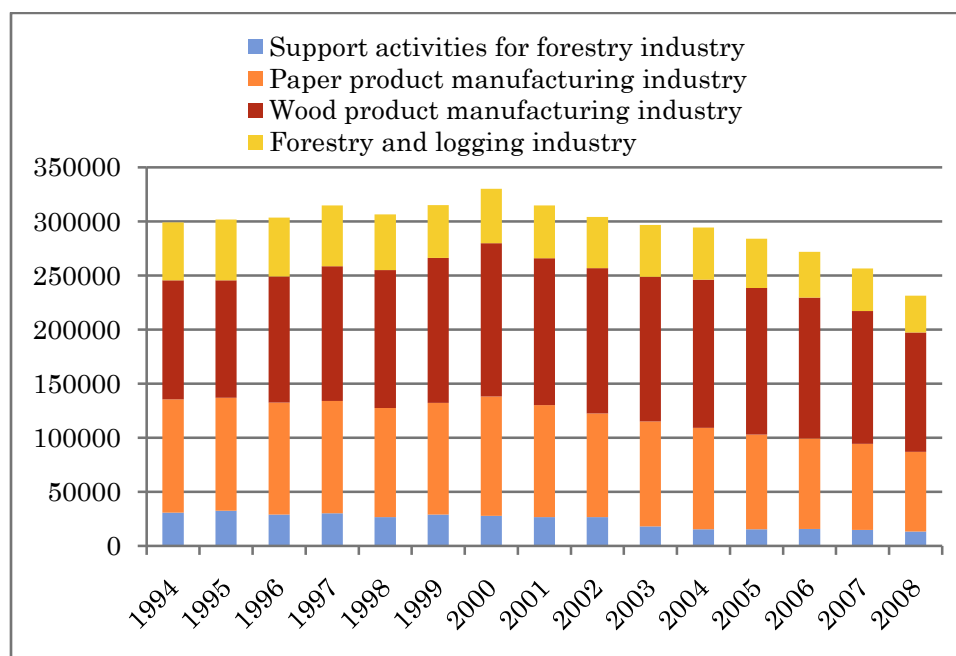
a) Economic Implications

Tembec had a near-death experience last year, but we were able to recapitalize and avoided the fate of AbitibiBowater, which is in bankruptcy protection. The pain continues; I have laid off 10 people in my group. Tembec employment has dropped from 10,047 people in 2004 to 6,727 in 2008. It is still dropping. We have laid off another 1,400 people this year. Our salary, payroll and benefits dropped from \$771 million in 2004 to \$508 million in 2008. That is a reduction of more than one-quarter billion dollars in salary and benefits.

Bill Love, Chairman of the Board, Canadian Wood Council

When the demand for Canadian wood products plummeted, the most immediate effect was a large number of layoffs in the forestry sector. Graph 8 shows the number of jobs created in the forestry industry per year since 1994. The downward trend begins after the year 2000, and employment has decreased every year since. Between 2000 and 2008, support activities for the forestry industry lost more than 50 per cent of their labour force; the paper product manufacturing industry lost 33 per cent; the wood product manufacturing industry lost 22 per cent; and the forestry and logging industry lost 33 per cent.

Graph 8 - Number of Jobs in the Forest Sector



Source: Canada's Forests, Natural Resources Canada,
<http://canadaforests.nrcan.gc.ca/statsprofile/economicimpact/>

Table 1 shows mill closures in the forestry industry by province between 2003 and 2008. These closures, along with job losses, reduced the forestry industry's share of the Canadian economy, but more significantly, they exacerbated economic troubles in forest-dependent regions of Canada.

Table 1 - Permanent and Indefinite Mill Closures in the Forestry Industry by Province from January 2003 to June 2008

	Permanent Mill Closures	Indefinite Mill Closures	Total Mill Closures	Total Layoffs
Alberta	6	4	10	1,366
British Columbia	20	28	48	10,367
Manitoba	0	0	0	15
New Brunswick	10	3	13	3,046
Newfoundland and-Labrador	1	0	1	485
Nova Scotia	0	2	2	430
Ontario	25	18	43	9,450
Prince Edward Island	0	1	1	35
Quebec	26	54	80	11,668
Saskatchewan	2	7	9	1,566
Total	90	117	207	38,428

Source: Forest-dependent communities in Canada, Natural Resources Canada,
http://canadaforests.nrcan.gc.ca/articletrend/top_suj/23 (accessed in July 2009).

b) Social Implications

It is true that the suicide rate and the discouragement is greater now than it was, in the rural world, both for farmers and for private forest operators, I can tell you that. I am now working on things I can do with these people. These are people who do not open up easily. The owners and the farmers are proud people, but in a good sense. These people do not talk about their situation.

Pierre-Maurice Gagnon, President, Fédération des producteurs de bois du Québec

In addition to facing decreased revenue, communities face the social and economic impact of employment loss in the forest sector. Employment loss can affect the emotional well-being of residents. In addition, the obvious impact is a loss of income, at least temporarily. This means less spending power to support other businesses and activities in a community, such as restaurants, movie theatres, sports teams and schools. Especially in the case of a forestry dependent community, a loss of employment can force relocation to another community.

Tom Burton, Director, District 4, Alberta Association of Municipal Districts and Counties

Behind the impersonal job loss statistics are human stories that are difficult to tabulate. These stories are both individual and collective. The fate of the forestry industry will have an impact on the future of hundreds of Canadian communities.

According to Natural Resources Canada, some 200 communities in Canada are at least 50 per cent dependent on the forestry industry.¹¹ The collapse of the forestry industry threatens the social fabric of these communities, going far beyond a simple column of economic figures. Psychological distress, crumbling infrastructure, reduced services and increased crime rates often plague rural communities whose dominant industry is in decline.

¹¹ Source: <http://canadaforests.nrcan.gc.ca/article/communities>

c) Ecological Implications

It might seem strange to discuss ecological implications when the lack of markets is one of the main problems wood producers face. However, a low price for fibre could mean a major slowdown in silvicultural activities and sustainable forest management practices on private woodlots. If the competitiveness of the forestry industry were based solely on low timber costs, it might lead private woodlot owners to abandon their forest management plans and encourage the overexploitation of natural, publicly owned forests. This could have serious long-term ecological consequences.

CHAPTER IV: THE FEDERAL GOVERNMENT’S ROLES AND RESPONSIBILITIES IN THE FOREST SECTOR

To properly determine where the federal government could be involved in the forest sector, it is important to examine its role and responsibilities in a historical and constitutional context. The following sections examine these aspects and present recent federal initiatives in the sector.

1. A Historical Timeline

The following three tables present the main milestones in Canadian forestry policy, beginning with the arrival of the first Europeans in North America. Table 2 provides an overview of the involvement in the forest sector up until the *British North America Act, 1867*. Table 3 explains how the authority granted under the Act was shared. Table 4 shows the evolution of federal forestry policy since Confederation.

Table 2 – Government involvement in the forest sector in colonial times¹²

1672	Under French rule, oak trees are de facto “nationalized” to be used exclusively for building ships for the French Royal Navy.
1721	White pine is designated for making masts for the British Royal Navy in Nova Scotia.
1775	New England sawmills want to export their wood, including white pine, to other nations, which conflicts with the British Crown’s policy of reserving white pine for the exclusive use of the government to make masts. The American Revolution increases the strategic importance of Canadian timber because Britain’s previously guaranteed supply of white pine from New England is no longer available.
1806	Napoleon’s continental blockade attempts to prevent Great Britain from trading with the rest of Europe. This blockade considerably increases British dependence on Canadian timber. By 1811, the Canadian timber trade to Britain is well established.

¹² This table is largely inspired by information from *The State of Canada’s Forests 1996–1997*, Chapter 2 “A History of Forest Legislation in Canada,” pp. 24–45.

1826	The first timber fees for wood cut on Crown lands are put in place in Upper and Lower Canada, New Brunswick and Nova Scotia.
1838-39	Tensions between New Brunswick and Maine reach their peak in the Battle of Caribou over logging rights along the Aroostook River.
1846	The lumber industry is booming: it is profitable and competition is fierce. The provinces progressively pass legislation granting tenure and licences for producing wood grown on Crown land.
1853	Wood trade is a key element in reciprocity discussions between the United States and the British colonies in North America. The Reciprocity Treaty signed in 1854 establishes free trade between the United States and British colonies of North America.
1866	Alleged support from Great Britain to the southern Confederate states and pressure from protectionist groups leads the United States to repeal the Reciprocity Treaty.

Table 3 – Forestry and the Constitution Act of 1867¹³

CANADA'S CONSTITUTIONAL FRAMEWORK FOR FORESTS
<p>Provincial Jurisdiction</p> <p>The Constitution Act of 1867 grants ownership and legislative authority over most publicly owned forest lands to the provinces, which control 71% of Canada's total forest land and 88% of Canada's commercial forest land. Each province is given ownership of "lands, mines, minerals and royalties" (s. 109), as well as the power to legislate for natural resources and environmental management. This includes authority over the management and sale of public lands...and of the timber and wood thereon (s. 92[5]), local works and undertakings (s. 92[10]), property and civil rights in the province (s. 92[13]), and matters of a local or private nature (s. 92[16]). The exclusive provincial jurisdiction over forest resources was confirmed by a Constitutional Amendment in the Constitution Act of 1982 (s. 92A), which also enables the provinces to levy indirect taxation on natural resource revenues and provides them with significant control over the interprovincial export of resources and energy.</p>
<p>Federal Jurisdiction</p> <p>The federal government's jurisdiction over forestry is based on its ownership of 23% of Canada's total forest land (mostly in the Yukon Territory and Northwest Territories) and 2% of Canada's commercial forest land. Its constitutional authority also enables it to influence forest management indirectly. This authority includes powers related to trade and commerce (s. 91[12]); Indians and lands reserved for Indians (s. 91[24]); criminal law (s. 91[27]); the general power to make laws for the peace, order and good government of Canada (s. 91 opening paragraph); and the power to make and implement treaties (s. 132).</p>

¹³ Source: *The State of Canada's Forests 1996-1997*, Chapter 2 "A History of Forest Legislation in Canada," p. 31.

Table 4 – Federal involvement in the forest sector since Confederation¹⁴

1899	Position of Chief Inspector of Timber is created within the Department of the Interior. This position led to the creation of the Forestry Branch in the same department. Ten years later the branch had 40 employees and a budget of \$100,000.
1915	Official opening of the first Forest Products Laboratory of Canada at McGill University in Montreal.
1918	Opening of the Forest Products Laboratory of Canada in Vancouver.
1936	The Forestry Branch becomes the Dominion Forest Service and constitutes one of the four units within the Lands, Parks and Forests Branch of the new Department of Mines and Resources.
1949	The <i>Canadian Forestry Act</i> of 1949 authorizes the federal government to enter into cost-sharing agreements with the provinces to establish forest resource development programs.
1950	The Dominion Forest Service becomes the Forestry Branch within the new Department of Resources and Development.
1953	The Forestry Branch moves to the Department of Northern Affairs and National Resources.
1960	The Department of Forestry is established.
1966	The Department of Forestry becomes part of the Department of Rural Affairs. The focus is on regional development policies and provincial cost sharing (e.g., access road construction and mill modernization).
1968	The new Department of Fisheries and Forestry assumes responsibility for the Forestry Branch, which is now called the Canadian Forestry Service (CFS).
1971	The CFS becomes a directorate of the Department of Environment. The Canadian Council of Resource and Environment Ministers is established; the federal government begins to focus on forest regeneration and management. Subsequent federal-provincial agreements reflect this theme.

¹⁴ This table is based in part on *The State of Canada's Forests, 1996-1997, Chapter 2 « A History of Forest Legislation in Canada »*, pp.24-25; and the 1990 report by the House of Commons Standing Committee on Forestry and Fisheries, *Forests of Canada: The Federal Role, Chapter 2A « Some Lessons from History »*, pp. 37-40.

1978	CFS forest products laboratories in Vancouver and Ottawa are privatized; Forintek becomes a private, non-profit corporation.
1980	The Third National Forest Congress seeks to rejuvenate federal leadership in forestry. The congress results in a series of policy statements that lay the foundation for the <u>first National Forest Strategy</u> .
1982	The federal government gives the CFS responsibility for managing federal-provincial agreements on developing forest resources. ♦ The U.S. lumber industry calls for countervailing duties to be imposed on imports of Canadian lumber; the government does not take action.
1984	The portfolio of Minister of State (Forests) is created within Agriculture Canada. The CFS is transferred to Agriculture Canada.
1986	Canada and the United States reach an agreement to impose a tax on exports of Canadian lumber.
1987	The <u>second National Forest Strategy</u> lays out the federal government's responsibilities regarding forestry, particularly trade development, public education, and research and development.
1989	The <i>Forestry Act</i> establishes Forestry Canada. The role of the new department is to promote sustainable development of Canada's forests.
1991	The Canadian government withdraws from the 1986 memorandum of agreement on softwood lumber signed with the United States and stops collecting a tax on exports to that country. The United States responds with countervailing duties.
1992	The <u>third National Forest Strategy</u> marks a turning point: forest policy now focuses on managing and promoting entire forest ecosystems, not just timber resources. ♦ The Model Forest Program is introduced to develop approaches to sustainable forest development that involve economic, environmental and social objectives, and to share the resulting knowledge and practices with the entire Canadian forest sector.
1993	Forestry Canada merges with the Department of Energy, Mines and Resources to form the new Department of Natural Resources (NRCan). ♦ The federal government withdraws from certain forest research and development activities in favour of a national science and technology policy.

1996	Federal-provincial funding agreements for forest management activities end in 1996 and 1997♦ The First Nations Forestry Program is introduced to provide funding and support to First Nations to participate in the forest sector♦ Canada and the United States agree to limit Canadian exports to the United States for five years.
1998	The fourth National Forest Strategy reiterates the major themes from the third national strategy. ♦ The four -year Value-Added Program is introduced to improve the competitiveness of the value-added wood processing industry.
2001	The United States reintroduces countervailing duties at the end of the 1996 agreement; a long series of trade disputes are brought before the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA) authorities.
2002	The Canada Wood Export Program is launched; the national, five-year initiative is designed to develop markets and increase exports of Canadian wood products to foreign markets♦ The Value -Added Program is expanded and renamed the Value-Added Research Initiative (it later becomes the Value to Wood Program).
2003	The vision of the fifth National Forest Strategy is as follows: “The long-term health of Canada's forest will be maintained and enhanced, for the benefit of all living things, and for the social, cultural, environmental and economic well-being of all Canadians now and in the future.”
2006	Canada-United States softwood lumber agreement. ♦ The federal budget allocates \$400 million over two years to combat infestations of the mountain pine beetle; \$127.5 million to support the sector's long-term competitiveness; and \$72.5 million for workforce adjustment initiatives.
2007	Forintek, Feric, Paprican and the Canadian Wood Fibre Centre merge to form FPInnovations. The organization is the largest not-for-profit forest research centre in the world.♦ The North American Wood First Initiative is launched and the Value to Wood Program is renewed.
2008	The sixth National Forest Strategy identifies two major national priorities: transformation of the forest sector and climate change.♦ The Community Development Trust is introduced and given a \$1 billion budget (administered by the provinces and territories) to help vulnerable communities. ♦ The London Court of International Arbitration determines that Canada has contravened certain provisions of the 2006 softwood lumber agreement.

2. Recent Initiatives

a) The Sixth National Forest Strategy

The sixth National Forest Strategy, *A Vision for Canada's Forests: 2008 and Beyond*, was released in December 2008 by the Canadian Council of Forest Ministers (CCFM). The CCFM includes representatives from the federal, provincial and territorial governments, and provides a forum for discussion and exchange of views on forestry-related issues of common interest, or with an intergovernmental or international standpoint.¹⁵ The recent forest strategy contains the following vision statement:

To be the best in the world in sustainable forest management and a global leader in forest sector innovation.¹⁶

Unlike previous national strategies developed by the CCFM which included several themes, this strategy focuses on two priorities of national importance: forest sector transformation and climate change. In terms of the first priority, traditional industries (wood and pulp) will continue to play an essential role in the economy.

However, transformation of the forest sector will focus primarily on new opportunities created through innovative products and technology. Climate change initiatives centre on two areas: mitigation and adaptation. Mitigation involves using the forest to increase carbon storage and thereby lessen the effects of greenhouse gas emissions. Adaptation refers to adjusting forest practices to reduce the negative impacts of climate change.

b) Additional Assistance in 2009 and 2010

In view of Canada's worsening forest crisis, the federal government provided the industry with the following additional assistance in 2009 and 2010:

- \$80 million over two years to Natural Resources Canada for the Transformative Technologies Program delivered by FPInnovations;
- \$40 million to Natural Resources Canada in 2010–2011 to develop pilot demonstration projects highlighting the commercial use of new products;
- \$40 million over two years to Natural Resources Canada for the Canada Wood Export Program, the Value to Wood Program and the North American Wood First Program to help companies market innovative products internationally;
- \$10 million to Natural Resources Canada in 2009–2010 to support large-scale demonstrations of the “Canadian-style” use of wood for

¹⁵ <http://www.ccfm.org/english/aboutus-overview.asp>

¹⁶ *A Vision for Canada's Forests: 2008 and Beyond*, Canadian Council of Forest Ministers (<http://www.ccfm.org/english/coreproducts-nextnscf.asp>).

construction in targeted offshore markets, and non-traditional uses of wood in domestic markets;¹⁷



- \$1 billion to the Community Adjustment Fund (CAF), to be delivered through the federal government's regional development agencies, to support job creation in communities that have been hit hard by the global recession. Projects eligible under the CAF include reforestation and silviculture, investments in equipment, and initiatives to increase access to international markets;
- Various initiatives to facilitate forest companies' access to credit (e.g., \$13 billion in additional funding to financial Crown corporations and an increase in lending limits). The Business Development Bank of Canada also received \$100 million to establish an operating line of credit guarantee program;
- \$1 billion to help Canadian pulp and paper producers increase the energy efficiency and environmental performance of their operations. Pulp and paper companies will be eligible for a credit of \$0.16 per litre of **black liquor** produced.¹⁸
- As part of Canada's economic action plan, the federal government launched a new program on 2 August 2010 known as the Investments in Forest Industry Transformation Program (IFIT). The purpose of this \$100 million initiative is to support the demonstration and introduction of new leading-edge technologies in the forest sector through investment in innovative practices in forest work.

3. Summary and Analysis

The provincial governments' exclusive jurisdiction over forest resources has an important historical foundation. Fee systems for timber cut on Crown land, which were introduced in 1826, eventually became a reliable and lucrative source of revenue for the colonies of British North America. As a condition for entering Confederation, the provinces therefore demanded that control over natural resources and the revenues from Crown lands be granted to the provincial governments. It is also interesting to note that pressure from U.S. protectionists as of 1866 contributed to the U.S. government's repeal of the Reciprocity Treaty (the term used at the time to describe free-trade agreements) with British North America. This event reinforced the need to develop east-west trade in Canada and is seen as an important catalyst for Confederation in 1867.

¹⁷ Source of picture: Centre d'expertise sur la construction commerciale en bois (Cecobois).

¹⁸ This initiative is also known as the Pulp and Paper Green Transformation Program.

Although forest resources are under exclusive provincial jurisdiction, we can see from the chronology in Table 4 that the federal government has played an increasingly important role in the forest sector. Its initial role focused mainly on establishing Canadian forest laboratories to conduct research and development. Federal involvement in forestry then took the form of cost-sharing agreements under the 1949 *Canadian Forestry Act*.

Regional development policies represented indirect means of supporting the forest sector in the 1960s. In the 1970s, federal policies began to emphasize forest regeneration and development. Subsequent federal-provincial agreements focused on the same themes. Canada's first National Forest Strategy, developed in 1981¹⁹, was a milestone as it confirmed the federal government's role in areas under its jurisdiction, such as trade development, public education, and research and development relating to forestry.

In the 1990s, the Canadian government's role focused on sustainable development and ecosystem-based management. Market development and resolution of trade disputes assumed greater importance throughout the decade. These responsibilities are still key elements of federal jurisdiction in the forest sector. It is also important to note that regional and community development programs have occupied a more central place in federal activities in recent years.

This historical overview defines the federal government's major areas of involvement in forestry:

- research and development;
- sustainable development, ecosystem-based management and climate change;
- regional and community development; and
- development of international markets and resolution of international trade disputes

¹⁹ A Forest Sector Strategy for Canada: Discussion Paper, 1981–1987

PART II

POSSIBLE SOLUTIONS: A FOUR PRONGED APPROACH

CHAPTER V: CULTURAL, INSTITUTIONAL AND REGULATORY BARRIERS TO THE INCREASED USE OF WOOD AS A BUILDING MATERIAL

The Standing Senate Committee on Agriculture and Forestry believes that many of the factors of the forest crisis as cited in Part I are difficult to address, and that the role of the federal government in addressing these issues is particularly difficult.

However, through the course of its deliberations, it has become clear to the Committee that one area of opportunity where the federal government can play an important role is in the area of **increasing the usage of wood and its by-products in Canada.**

Surprisingly, although Canada is indeed a nation of forests, the use of wood in commercial construction and infrastructure projects is rare. As will be examined later in this report, the Committee heard that Canada does not actually have a “wood culture”. Throughout the hearings of the Committee witnesses repeatedly stated that there were cultural, institutional and regulatory barriers to the use of wood in the residential and non-residential construction sectors in Canada.

Although the industry has identified the non-residential sector as being the way of the future, a number of witnesses said that the industry and governments would be making a serious mistake if they stopped trying to innovate in manufactured wood products for the residential market.

The following sections of this study underline some key areas of opportunity for the federal government to break down the cultural, institutional and regulatory barriers to the increased use of wood as a building material.

1. Cultural Barriers

Canada has 402.1 million hectares of forest and other wooded land, representing 10 per cent of the world’s forest cover and 30 per cent of the world’s boreal forest.²⁰ Canada thus has fabulous forest resources of which few countries can boast. We must establish a “wood culture” in universities, in the wood processing sector and among professionals such as architects, engineers, construction workers and the public in general.

²⁰ Source: Natural Resources Canada, *The State of Canada’s Forests*, Annual Report 2009, (<http://warehouse.pfc.forestry.ca/HQ/30071.pdf>).

I would love to see our nation move to a sense of ambition, of world leadership and dominance in the way we express wood and the way we build with wood. We are wonderful at cutting down trees but we still export them and hope others use them well. We have to learn how to celebrate our own material in the architecture we do.

Michael Green, Architect, as an individual

Witnesses strongly advised the Committee that the Canadian forest sector should take the necessary steps to establish a “wood culture” across Canada. A number of witnesses cited the Scandinavian countries as an example, as well as Austria, Germany, France and Switzerland for their wood heritage, and contemporary know-how in wooden construction. For some, the key to establishing this “wood culture” in Canada lies with the next generation of architects, engineers and professionals working in the wood products manufacturing and construction sector.

The key to success is, first, better education on the opportunities that wood affords as a construction material. Sector professionals must know the advantages and characteristics of wood as a construction material from the standpoints of the environment, physical resistance, versatility, fire resistance, aesthetic appeal, insulation capability and its heritage, contemporary and economic value.

According to English anthropologist Sir Edward Burnett Tylor, culture can be defined as follows:

“Culture is that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities or habits acquired by man as a member of society.” (Tylor, Primitive Culture, 1871)²¹

However, to establish this culture through the construction sector’s value chain, certain prejudices concerning wood among the public must be resolved.

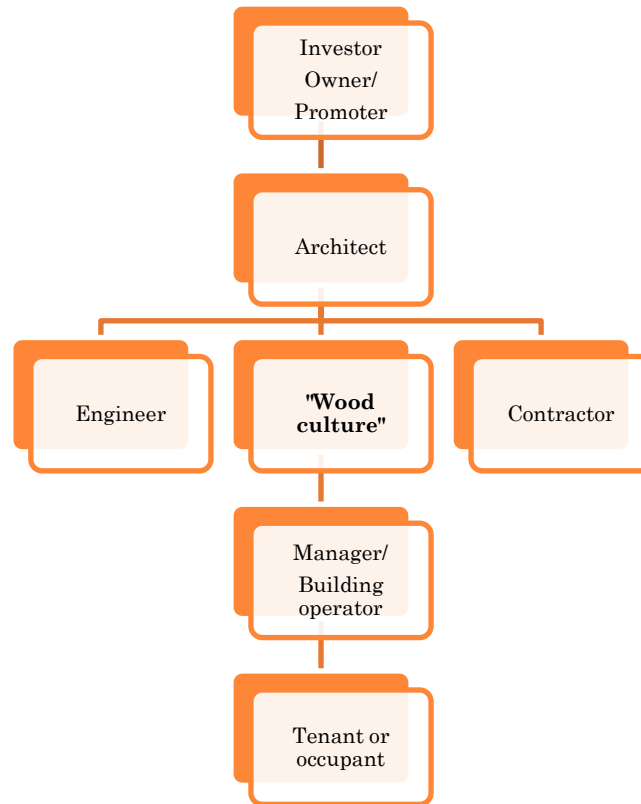
To resolve these prejudices, the industry and the federal government must not simply rely upon the academic community. It must also promote wood in the Canadian market, and demonstrate the viability of Canadian manufactured wood products through demonstration projects in Canada in both the residential and non-residential sectors.

To successfully establish a true “wood culture”, the Canadian forest industry must address public doubts about the “tree killer” syndrome weighing on the industry, even though consumers are beginning to recognize that wood is a renewable and environmentally friendly material. The industry must also sweep away fears about the fire resistance of manufactured wood products and their inaccessibility to the general public. A true “wood culture” begins, therefore, with education.

²¹ http://www.granddictionnaire.com/BTML/FRA/r_Motclef/index800_1.asp.

Figure 3 illustrates the key role that a “wood culture” could play in the commercial building value chain.

Figure 3 - The “wood culture” must become a central part of the commercial building value chain



a) Education

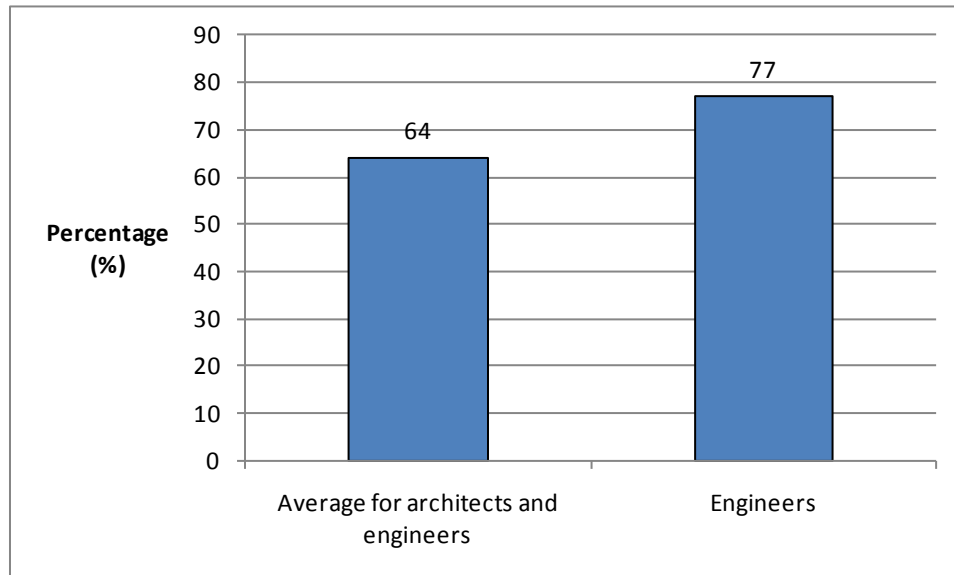
According to the Centre d’expertise sur la construction commerciale en bois (CECOBOIS), 80 per cent of non-residential buildings could be built using wooden frame construction, whereas only 15 per cent are currently built in this manner. It therefore appears that a market share of approximately 65 per cent is there for the taking.²² Why is this the case?

This small market share of wood in the non-residential construction industry may be explained in part by the fact that 64 per cent of engineers and architects believe they have received very little or no training in wood. Considering engineers alone, the

²² Source: CECOBOIS (<http://www.quebecwoodexport.com/fr/event/documents/LouisPoliquin.pdf>).

figure rises to 77 per cent.²³ Graph 9 shows the high percentage of professionals who say they have received very little or no training in wood.

Graph 9 - Percentage of architects and engineers who say they have received very little or no training on wood as a construction material



Source: CECOBOIS

Interestingly, architects (45 per cent) and engineers (20 per cent) together represent 65 per cent of professionals who influence the choice whether to use wood in non-residential construction. Owners and promoters represent 28 per cent, while general contractors represent only two per cent and occupants one per cent. Approximately four per cent of respondents could not determine which professionals had the most influence over the use of wood in the non-residential sector.

Throughout the Committee's hearings, witnesses noted on numerous occasions that architects and, more particularly, engineers have little training, specifically related to wood.

In a four-year civil engineering program, very few courses focus specifically on wood. In the first year, students are required to undertake a course on various building materials, including wood. The course provides students the opportunity to familiarize themselves with the characteristics and physical properties of building materials. In the second year, a similar course is given, and lasts only two to three weeks.

²³ *Ibid.*

The civil engineering curriculum also offers a course in design using wood and steel. Approximately two and a half weeks of the 13-week course is spent analyzing the attributes and properties of wood. Another course examines a set of buildings in which works in wood, masonry and concrete are discussed.

In short, students are introduced to a number of materials, and wood receives only limited attention. To establish a true “wood culture”, future engineers and architects must be more exposed to various wood materials. They should not just study the characteristics of conventional “2 X 4s”, but especially look at new products such as engineered wood, glulam beams, laminated structural panels, wood-fibre insulation and so on.

In order to establish a “wood culture”, to stimulate young people’s interest in wood science, and to promote advanced university research, the Committee believes that engineers and architects should have access to a mandatory university course focusing solely on wood in which they would learn the properties and physical and structural characteristics of wood.

i) Multidisciplinary Research Chairs in the Design and Construction of Wood Buildings

A number of stakeholders mentioned during the hearings that it would be highly appropriate to introduce multidisciplinary research chairs in the design and construction of wood buildings across the country. Several Canadian universities already have forestry faculties and departments specializing in wood science. These include: the University of Moncton, Laval University in Quebec City, the University of Toronto and the University of British Columbia.

However, to really develop a “wood culture” in the Canadian academic community, expertise in the construction of wood buildings must also be developed outside forestry faculties. The disciplines of architecture, civil engineering, mechanical engineering and even electrical engineering can all play a role in the construction sector and must develop a wood materials culture.

Through the Canada Research Chairs, the National Science and Engineering Research Council of Canada and Natural Resources Canada, the federal government is well placed to assist in establishing and funding multidisciplinary research chairs in the design and construction of wood buildings. Once established, these chairs can attract Canadian or foreign researchers who are international leaders in the field. These Canadian chairs must collaborate in order to disseminate research findings across the country and around the world. Once the chairs are in place, the federal government should also offer university scholarships, from the undergraduate to the doctoral level, in the design and construction of wood buildings field.

A chair that promulgates wood design and construction would be critical.

Jon Hobbs, Executive Director, Royal Architectural Institute of Canada

I would love to see one day one of the Canadian universities have a chair of wood design and wood engineering. I have already been delegated by the federal government, through the embassy in Prague, to attend the International Wood Construction Conferences on two occasions five years apart. That conference, which takes two days, brings in close to a thousand engineers, architects, scientists, researchers and professors from around the world, from all kinds of universities. The level of science, knowledge and competence that I witness when I am there makes me feel inadequate. Here I feel like I am a one-eyed person among the blind.

Lubor Trubka, Architect, as an individual

I am envisaging this collaboration between mechanical engineering, which looks at different types of joinery equipment and technologies that may also include some electrical engineering, and civil engineering from the side of the material, structural capacity and characteristics of some of the new composite materials that might come out of wood industry. Certainly, the application and material understanding would come from architecture. A single chair may not give you the impact you need.

Brenda Y. McCabe, Faculty of Applied Science and Engineering, Chair of the Department of Civil Engineering, Associate Professor, University of Toronto

ii) International University Competition in the Design and Construction of Wood-frame Structures

A number of university competitions are organized in forestry, engineering and architecture to stimulate the creativity of tomorrow's professionals. These competitions enable competitors not only to put theory into practice, manage a project and use their creativity, but also to exchange ideas.

In civil engineering, the American Society of Civil Engineers has for several years organized a concrete canoe competition at American and Canadian universities. Its Canadian counterpart was introduced more recently. The competition combines a technical aspect with sporting rivalry among teams, since the canoes must be able to float at the culminating point of the competition: the race.

Similar competitions are also organized for wood, but appear to be smaller in scale. The Canadian Wood Council (CWC) has established a wood catapult competition. There is also a wood structure competition for civil engineering students in Western Canada.

The Committee believes there should be an international university competition for wood structures open to engineering, architecture and forestry students. Canada would host the competition, and Canadian students would thus be able to speak with students from countries where the “wood culture” is more firmly established.

Therefore:

Recommendation 1

The Committee recommends that the Government of Canada promote a “wood first” culture among Canadians through education and outreach. To this end, the Committee recommends that the Government of Canada:

- **in cooperation with the Council of Ministers of Education Canada, universities, technical colleges, the Engineering Institute of Canada and the Royal Architectural Institute of Canada, works to develop a mandatory course that would be dedicated to the use of wood as a building material in multi-storey non-residential and residential sectors;**
- **in cooperation with the Canada Research Chairs, the Natural Sciences and Engineering Research Council of Canada and Natural Resources Canada, work with Canadian universities and the forest industry to establish four multidisciplinary research chairs in the design and construction of wood buildings, to be located in the Maritimes, Quebec, Ontario and Western Canada; and**
- **through Natural Resources Canada and in cooperation with the Canadian Wood Council and Canadian universities, sponsor an annual or biennial international university wood structures competition for engineering, architecture and forestry students.**

iii) Steel and Concrete Industry Support for the Canadian University Sector

Every year, the Canadian Institute of Steel Construction (CISC) allocates \$100,000 to research through the Steel Structures Education Foundation. Various steel companies provide this funding for advanced research to improve construction materials and the steel industry’s competitiveness. Funding for engineering and architecture research enables the steel industry to remain competitive with the manufactured wood products industry and the concrete and masonry industry. The

Foundation also organizes conferences for architecture and engineering professors where they are informed about recent steel innovations. Every 10 years, the cement industry publishes a *Concrete Design Handbook*, which is a reference book for Canadian academics, and other key stakeholders by the Cement Association of Canada.

The Committee believes that Canada's forest industry should draw on some of these initiatives in order to engage both experts and students in engineering and architecture disciplines throughout Canada's colleges and universities.

Each year we devote over \$100,000 to research, which comes from the industry, my competitors and I, so that we can have research done on our building material as to what can make it more efficient and more competitive. We do not need to be competitive against each other but against other building materials such as concrete and wood, and masonry to some extent but very little. The wood industry should do this.

Rob Third, President, George Third & Son Ltd.

b) Promotion of Innovative and Traditional Manufactured Wood Products in Canada

The Committee and many witnesses believe that more promotion and marketing must be done in the Canadian market to raise the profile of innovative and traditional Canadian manufactured wood products. A number of witnesses noted that Canada has done a good job promoting Canada's wood products internationally but that domestic consumers are not sufficiently aware of the various products available.

We have focused our efforts on educating our importers — the foreign customers — with little or no additional effort to educate Canadians. Wood, forest and lumber production is part of our heritage and over time, perhaps, we have taken for granted that it is a logical product of choice for both environmental and building attributes. We have neglected to invest in the broad range of educational activities that are needed to inform future generations of Canadians.

Diana Blenkhorn, President and Chief Executive Officer, Maritime Lumber Bureau

Consequently, the Committee believes that Natural Resources Canada should reinforce and increase funding for the Canadian component of the North American Wood First initiative. This program, which was introduced in 2007 and is scheduled to conclude in 2011, funds activities designed to increase the use of wood in **non-residential** applications in Canada and in targeted regions in the United States.

Among other things, the program supports promotional missions, trade fairs and seminars.

The Committee believes that, in the future, Wood First should also include innovative activities for the residential sector.

We must not forget about residential construction. And not just because 85 per cent of residential buildings in Canada are built out of wood. [...] Those of you who have a wood-framed house, can you tell me how many square inches of wood you see in your house? It is completely covered in drywall [...]. I am not saying Canada should start building cabins again, that we should return to log cabins; we must move on from that style. But we should think about wood architecture in Scandinavia or Japan; it is extremely modern, and younger generations have an appetite for light, modern architecture.

André Bourassa, Architect and President, Ordre des architectes du Québec

A portion of Wood First funding should be allocated solely to the Canadian market. Currently eligible program recipients are:

- primary and secondary wood product associations; and
- universities and not-for-profit organizations engaged in forest product research.²⁴

The Committee believes that, under the program's Canadian component, individual companies should be eligible for North American Wood First funding in order to raise the profile of innovative wood products manufactured in Canada. On this individual companies aspect, Natural Resources Canada could draw on the Agri-marketing program of Agriculture and Agri-Food Canada, which grants access to funding for private businesses that market innovative agri-food products.

The Committee also believes that the federal government should continue to support *WoodWORKS!* and the Canadian Wood Council to enable more architects, engineers, workers, construction businesses and consumers to be more aware of the properties of wood.

²⁴ <http://scf.rncan.gc.ca/subsite/wood-markets/wood-first>.

Support Wood WORKS!, the Canadian Wood Council and Wood WORKS! programs through their communication programs. They need help. They operate on \$3 million per year, a considerable part of which is from the federal government, industry and the provinces. They do a wonderful job of communicating and educating the public and industry about how wood can be used appropriately.

Larry McFarland, Architect, as an individual

c) Increase the Number of Demonstration Projects in Canada

For 2009-2011, Canada's Economic Action Plan granted Natural Resources Canada \$10 million to support large-scale wood demonstration projects in the international and Canadian markets. Most of the funding is granted for international demonstration projects as in China, South Korea and Italy.

For the Canadian market, demonstration projects must highlight innovative uses of wood in non-residential applications (such as schools, shopping centres and hospitals) and must be based on the initiatives taken under the North American Wood First program.

During the Committee's proceedings, some witnesses noted that we must increase the number of demonstration projects in Canada while retaining funding levels for the international component. Canadian projects must target both residential and non-residential markets. To establish a "wood culture" from one region to another in Canada, we must be able to show Canadians that wood and wood products are environmentally friendly, renewable, resistant, aesthetically pleasing and functional products.

Canadian consumers must be shown that innovative manufactured wood products are both accessible and modern. In this regard, according to one witness, the federal government should set an example by promoting the introduction of wood demonstration projects in the National Capital Region.²⁵

... But we also need other, different-scale presentation projects. I am going to go back to cooperation, but I want to insist on the fact that while we are currently focused on promoting the use of wood in non-residential construction, we cannot forget about promoting the use of wood in small homes and small buildings.

André Bourassa, Architect and President, Ordre des architectes du Québec

²⁵ Evidence of André Bourassa, Architect and President, Ordre des architectes du Québec, April 13, 2010.

Therefore:

Recommendation 2

The Committee recommends that the Government of Canada maintains or increases funding to key programs that promote the use of wood in both residential and non-residential buildings. To this end, the Committee recommends that:

- Natural Resources Canada amend the North American Wood First initiative after the 2010-2011 fiscal year and renew it for a ten-year period. The program should maintain its funding for non-residential activities, and add a component targeting innovation in the multi-storey residential sector;
- The Government of Canada increase annual or multi-year financial support for *Wood WORKS!* (Cecobois) and the Canadian Wood Council. Funding granted should be based on tangible results; and
- Natural Resources Canada extend the wood demonstration projects initiative for a period of five years beyond the 2010-2011 fiscal year to target foreign markets as well as the Canadian market. For the Canadian market, the goal would be to have demonstration projects in every province and territory in Canada, and could include the use of wood in constructing recreational facilities such as hockey arenas and community centres.

2. Institutional Barriers

One of the many current problems in the Canadian forest sector is the lack of a consistent approach in dealing with a number of issues between the industry, the provinces and the federal government. This lack of consistency may be explained by the fact that there are institutional barriers in both the private and public sectors. These institutional barriers act as a form of compartmentalization between public and private administrations.

We are also witnessing diverging interests among provinces as a result of the various approaches of the provincial forest systems, the various species of trees harvested which may confer a competitive advantage on one region over another and high competition in the private sector.

For the federal government, the key is therefore to decompartmentalize exchanges between public and private administrations while not interfering in the provinces' constitutional jurisdiction fields.

The profusion of federal and provincial structures, government programs and a lack of communication further complicate the problems facing the industry and may

result in a mismatch among the various types of government involvement. The result is thus an under-optimization of financial and human resources. To correct this lack of consistency, witnesses suggested introducing a pan-Canadian round table whose ultimate purpose would be to forge a new Canadian wood policy.

Another institutional barrier that seriously affects Canada's forest industry is the lack of access to credit at competitive borrowing rates. The recent crises in the Canadian forest industry, together with the financial and economic crises that have hit the global economy, have made the banks reluctant to lend money at competitive interest rates to what is considered a high-risk industry. Without access to credit, the industry finds itself in a vicious circle, which makes it difficult to invest in innovation, and in turn impacts its ability to compete.

A third institutional barrier, which is related to the behaviour of the private sector, is Canada's high degree of reliance on the U.S. market for forest product exports. In the Committee's view, this dependence must decline, and Canada must find other outlets in international markets to diversify its exports. In addition, on the import side, witnesses told us that the trade in smuggled wood from developing countries in particular is having negative effects on the Canadian forest industry.

a) A National Round Table for the Forest Industry Value Chain

The value chain concept is becoming increasingly popular in a number of sectors of the economy. The value chain differs from the supply chain, which is limited to transactions between various industry segments. The value chain is more extensive in its approach, as stakeholders must study the industry as a whole, while setting aside their differences and being aware of the interdependence of the various links in the chain. From this perspective, the entire industry is thus being assessed.

A value chain round table would make it possible to bring together key stakeholders from a variety of perspectives within the chain, ranging from private, public and academic sector leaders; forest managers; research and development institutes; marketing and processing experts; and bioenergy and bioproducts producers and experts.

A round table allows for a common understanding of the industry's competitive position, builds consensus on the best way to move the industry forward, and provides a forum to develop and implement a common vision and action plan for Canada's forest industry.

Such a forum could also address issues in which the federal government has a role to play. The industry, governments and the academic sector thus work in close cooperation to achieve common objectives.

A round table on the value chain appears to be a good tool for generating synergy, as a number of stakeholders mentioned the lack of consistency between industry and governments.

The Committee notes, apart from the Canadian Council of Forest Ministers (CCFM), which serves as a forum for dialogue between the federal, provincial and territorial governments, there does not appear to be any round table that jointly involves the governments, the industry and the academic sector so as to forge a common vision and action plan for the forest industry.

Another area where the federal government could help a lot, I think, would be to help structure a pan-Canadian wood industry because, as it has been said many times, no one knows what is going on from one town to the next; people are very isolated.

André Bourassa, Architect and President, Ordre des architectes du Québec

In addition, in evidence given before the Committee, Avrim Lazar, President and CEO, Forest Products Association of Canada, outlined four promising lines of transformation for the Canadian forest industry:²⁶

- Improving the industry's productivity and efficiency;
- Becoming less reliant on the U.S. marketplace;
- Taking advantage of Canada's environmental practices in the forest sector; and
- Extracting more added value from every tree in order to optimize the value of wood cut (e.g., engineered wood products, bioenergy, biofuels and biochemicals).

A national round table on the value chain could enable the industry to develop more fully along these four lines. The round table would be funded by Natural Resources Canada, and would include representatives from the federal government, provinces, the territories and the industry.

A national round table on the value chain in the forest sector could have a mandate not only to develop joint strategies for the four lines of transformation suggested by the Forest Products Association of Canada, but also to forge a policy on lumber use in the non-residential sector in Canada.

The idea of developing a national policy on lumber use in the non-residential sector was also raised by Mr. Lazar, as well as Guy Chevrette, President and Chief Executive Officer and Communications Director, Quebec Forest Industry Council, and Diana Blenkhorn, President and Chief Executive Officer, Maritime Lumber Bureau.²⁷

²⁶ Evidence of Avrim Lazar, President and Chief Executive Officer, Forest Products Association of Canada, May 4, 2010.

²⁷ Evidence of Diana Blenkhorn, President and Chief Executive Officer, Maritime Lumber Bureau, April 29, 2010; Avrim Lazar, President and Chief Executive Officer, Forest Products Association of

Government can help us with a wood-first policy, so that we can get more wood into non-residential buildings.

Avrim Lazar, President and Chief Executive Officer, Forest Products Association of Canada

I also believe that we need a national policy on lumber usage to stimulate domestic consumption.

Guy Chevrette, President and Chief Executive Officer and Communications Director, Quebec Forest Industry Council

In addition, as Guy Chevrette mentioned, although forests are a provincial jurisdiction, international trade and international treaties are federal responsibilities. There should be a complementary relationship between the federal and provincial governments particularly with regard to assistance and support programs.²⁸

A national round table on the value chain in the Canadian forest sector could result in a better meshing of federal and provincial government measures in the forest sector in order to optimize resources.

Therefore:

Recommendation 3

The Committee recommends that Natural Resources Canada establish and fund a national round table on the value chain in the Canadian forest industry. The round table would serve as a discussion mechanism between the private, public and academic sectors in order to establish action plans on policy coordination, innovation and new market opportunities.

Canada, May 4, 2010; and Guy Chevrette, President and Chief Executive Officer and Director of Communications, Quebec Forest Industry Council, May 4, 2010.

²⁸ Evidence of Guy Chevrette, President and Chief Executive Officer and Communications Director, Quebec Forest Industry Council, May 4, 2010.

b) Access to Credit

As noted in Chapter II on the causes of the crisis in the Canadian forest sector, the Committee is well aware of the harmful effects of exchange rates and energy prices on the forest industry. However, governments have very limited power to influence these economic parameters directly. In spite of that observation, the federal government clearly has a role to play in assisting the industry in adjusting to these new economic conditions.

For example, over the last 20 years, we helped new small contractors to invest in equipment and recapitalize their operations by guaranteeing bank notes so they could get access to capital at prime plus 1 per cent. I use that as an example because it is a key element of the idea to make credit available to new operators at competitive rates if we are to stay competitive in the forest. Credit must be available and competitively priced.

Robert Pinette, Vice-President of Woodlands, J.D. Irving Limited

The Committee has observed that access to credit can be extremely difficult for forest businesses throughout the value chain. The purpose of government intervention must be to ensure fair and equitable access to credit for forest businesses based on business criteria. For example, the vice-president of Export Development Canada (EDC), which is a Crown corporation, outlined EDC's lending policy to the Committee as follows:

It is important to note that EDC operates in the commercial sphere, just like any bank. Like any bank, our customers must be credit-worthy, they must be recourse-worthy and we must believe in their business plan and understand how they will repay our loans over time.²⁹

EDC's policy is to avoid competing in the same market segments as the private chartered banks. However, if the chartered banks become overly cautious in their traditional market segments by charging very high interest rates or denying access to credit or for reasons that are not commercially justifiable, the question is then which financial institution can take over? Some comments by EDC's vice-president indeed suggest there is a low level of competition among chartered banks in the forest sector:

Unfortunately, I would say that many of our customers, especially some of the smaller and mid-size ones, are now viewed to be much riskier prospects. Many people would say we have to increase rates to that level. There is very little competition for forestry business, as you can imagine, amongst lenders today. Therefore, they are probably paying, on average, higher than many other

²⁹ Carl Marcotte, Vice-President, Resources Group, Export Development Canada, Issue 6, Evidence of June 9, 2009.

*sectors. Unfortunately, however, it is not out of line with the kinds of risks people face. The markets are so significantly depressed that it is almost anyone's guess as to when they come back for some parts of the industry. Therefore, the risks are almost unquantifiable for some lenders. They will look at that and say, "Well, if I cannot be sure, either I say no or I want 25 per cent." It would not be an unheard of conversation, I am sure. It is very difficult for smaller companies.*³⁰

It should be noted that the issue of access to credit was resolved in the agricultural sector when Farm Credit Canada (FCC) competed directly with the chartered banks. FCC is moreover a commercial success as it is a fully self-funded federal Crown corporation which, in 2008-2009, generated a profit of \$212 million and posted continued growth for the sixteenth consecutive year. The committee believes that, in the medium-term, it is essential to assess the possibility of creating a "Forest Credit Canada," which would act in market segments where there is little competition among chartered banks.

Therefore:

Recommendation 4

The Committee recommends that the Minister of Natural Resources explore, with the Department of Finance, the possibility of establishing a viable "Forest Credit Canada" to offset the lack of competition among chartered banks in certain market segments.

³⁰ *Ibid.*

c) Export market diversification

... we have to ... become less reliant on the U.S. marketplace; less reliant on residential construction and more on non-residential; less reliant on the traditional commodities — for example, less on two-by-fours and more on engineered wood; and to penetrate the Asian market and the markets of the emerging economies.

Avrim Lazar, President and Chief Executive Officer, Forest Products Association of Canada

Canada ranks among the largest producer and exporter of forest products in the world. However, at the Committee's hearings, a number of witnesses lamented the Canadian forest sector's heavy reliance on the U.S. market. Some witnesses mentioned that Canada is not seizing upon market opportunities in Europe, Asia, Latin America and even some Middle Eastern countries.

To provide a brief overview of the situation, total Canadian exports of forest products amounted to \$43.3 billion in 2002 but declined to \$23.8 billion in 2009.³¹

The United States is still our largest market. In 2009, Canada shipped exports worth \$16.8 billion to the United States, which represented 70.5 per cent of total Canadian exports of forest products.

Relative to 2002, however, that was a decline in the share of exports since it had previously been 79.7 per cent. As has been mentioned in Part I, a number of factors, including a sharp cut in the number of housing start-ups in the United States in the past few years may force the Canadian industry to turn more to other markets. On the other hand, that kind of market diversification could put pressure on demand in the United States and push up prices in the North American market.

China is Canada's second largest market receiving \$1.86 billion in Canadian exports. Despite the global recession, Chinese demand for Canadian forest products has constantly increased since 2002. In fact, Canadian exports to China have risen by \$1.1 billion since 2002 and, percentage-wise, Canadian exports to that destination have risen from 1.8 per cent to 7.8 per cent. Total Chinese demand in round log equivalent will be 350 million cubic metres in 2015, whereas Chinese production should reach 200 million cubic metres.³²

As with the United States, China is not self-sufficient and surplus Chinese demand should reach 150 million cubic metres.

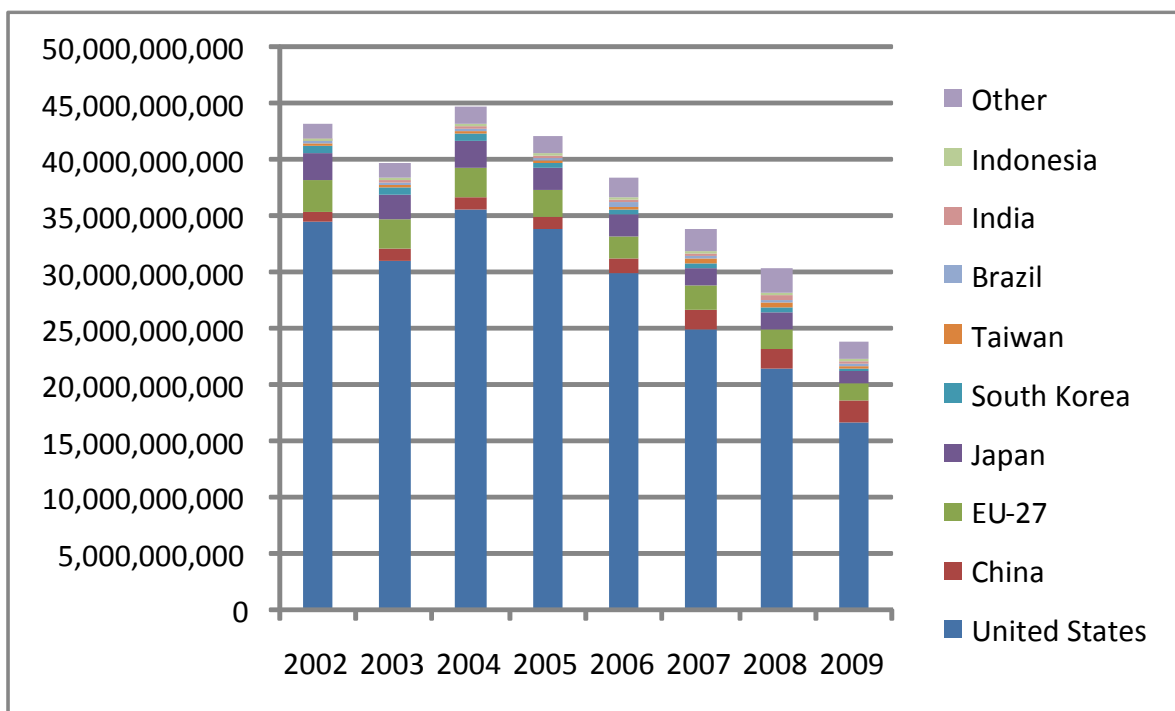
³¹ Total Canadian exports of forest products include: raw wood products, manufactured wood products, pulp and paper products and non-timber forest products.

³² Wood Markets, April 2010.

However, to seize greater market share in China or other markets, Canadian sawmills will have to adopt a better customer approach. It is reported that British Columbia sawmills are shipping lumber and panels in North American dimensions to China, whereas the Chinese market is used to Russian dimensions (Russian lumber and panels are cut in four-metre lengths).³³ Some adjustments to customer service by the Canadian industry therefore seem necessary in order to attract new clients for Canadian wood products.

The European Union (EU) was the third largest market for Canada's exports with \$1.42 billion (a 50 per cent decline relative to 2002). It is interesting to note that, in the late 1980s, Canada exported more than \$3 billion worth of forest products to the EU. It would therefore be desirable for the negotiations for a comprehensive economic and trade agreement between Canada and the EU to be able to improve access to the European market and perhaps even to restore Canadian exports to the EU to levels recorded in the 1980s.

Graph 10 – Total Canadian exports for forest products, 2002 to 2009 (in dollars)



Source: Natural Resources Canada.

³³ <http://foresttalk.com/index.php/2009/11/25/why-aren-t-b-c-sawmills-cutting-wood-in-the-dimensions-their-chinese-customers-prefer>.

The Committee is of the view that Canada's heavy reliance on U.S. export markets must be corrected. Since 2002, Natural Resources Canada has established the Canada Wood program, which funds activities that help Canadian wood producers expand and diversify export opportunities in traditional and emerging overseas markets, such as Europe, Japan, China and South Korea.³⁴ However, that program is concluding in 2011, and it appears that innovative companies such as Chantiers Chibougamau have not been made aware that these kinds of programs exist:

Chantiers Chibougamau is not aware of these programs implemented by the Canadian government to increase exports on the European markets, for certifications, for all the costs associated with what we call a new market. If there is such a thing and if we are told about this tomorrow morning and that it does not cost us any more to run the subsidies program than what we receive in direct aid, we will be very pleased to resort to such programs.

Frédéric Verreault, Director of Corporate Affairs and Communications, Chantiers Chibougamau

Therefore:

Recommendation 5

The Committee recommends that Natural Resources Canada extend the Canadian Wood program for another ten years (reviewable after five years) as of 2011 to enable Canadian forest product exporters to be more competitive on the global market.

3. Regulatory Barriers

It was clear from the evidence heard before the Committee that the idea of wood as a building material in the multi-storey building sector faces regulatory barriers.

For a number of construction industry professionals wishing to innovate by building multi-storey wood-frame structures, these regulatory barriers cause delays and raise significant obstacles that must be overcome. For those professionals, these regulatory barriers are one of the factors putting wood at a competitive disadvantage relative to other materials such as concrete and steel used in the construction of multi-storey buildings, whether it be for residential or non-residential sector.

³⁴ <http://scf.rncan.gc.ca/subsite/wood-markets/program>.

The National Building Code (NBC) was cited by many witnesses as a major regulatory barrier to the increased use of wood in the construction of multi-storey buildings. However, it is important to emphasize that some of the standards prescribed by the NBC ensure the protection and safety of the public.

The NBC has four objectives, including occupant safety, and protection against fire and structural damage. It is therefore important for decisions made by the NBC to be based on scientific data.

One of the objectives of Canadian regulatory authorities governing the national, provincial and territorial codes is to ensure the safety of building occupants, occupant health, and evacuation within reasonable time frames and to ensure that structural elements are fire-resistant for a determined period of time.

Since there are often unfavourable prejudices against wood, compared to other materials, in the area of fire protection, the Committee wishes to emphasize unequivocally that it wants to promote the increased use of wood in the residential, non-residential and multi-storey construction sector without however compromising the safety of building occupants.

The Committee is confident that provinces and territories have the necessary expertise and ingenuity to topple regulatory barriers and prejudices that block new opportunities for wood in the construction sector while maintaining impeccable safety levels.

The following comment by a representative of the Canadian Association of Fire Chiefs sweeps away certain prejudices about the fire risks of multi-storey wood-frame buildings³⁵:

a) National Building Code

I will go back to the objective-based code. If the building satisfies the provisions of the objective-based code, whether it is constructed out of metal, steel, wood or concrete, as long as it satisfies the provisions of those codes and is equipped with a sprinkler system, we would have no objection.

**Brian Maltby, Division Chief, Fire Prevention, Brampton Fire and Emergency Services,
Canadian Association of Fire Chiefs**

³⁵ Brian Maltby, Division Chief, Canadian Association of Fire Chiefs, Ottawa, Thursday, March 18, 2010.

In Canada, the first National Building Code (NBC) was published in 1941 as a result of a federal government initiative. At the time of the Committee's study, the NBC 2005 was the most recent national code. However, it should be noted that the NBC 2010 was published at the end of 2010.³⁶ The NBC 2005 was based on four objectives; that is to say, all its requirements are linked to one or more of the following objectives:

1. Safety
2. Health
3. Accessibility
4. Fire and structural damage protection of buildings

At the national level, the NBC serves as the model code for the provinces and territories, although provincial and territorial authorities may adopt or adapt the NBC and enforce its requirements. Those authorities thus use the national model codes as a basis for their regulations because, under Canada's *Constitution Act*, the provinces and territories are responsible for establishing building standards.³⁷

The provinces and territories are thus entirely responsible for establishing, adopting and implementing building codes, as well as for inspecting and ensuring compliance with legislation and regulations; the two functions that are often delegated to the municipalities as well. While the Committee respects provincial and territorial jurisdiction over building codes, it would like the NBC, which serves as a model code in Canada, to be forward-looking with regard to the utilization of wood.

Consequently, to make amendments to the NBC, the National Research Council of Canada (NRCC) must adopt a partnership approach with the provinces and territories. To guide partnerships involving the provinces, territories and federal authorities, NRCC has established the Canadian Commission on Building and Fire Codes (CCBFC) to develop Canada's national model codes.³⁸ CCBFC's role is to develop and update the following national model codes with the assistance of nine standing committees and various working groups:

- National Building Code;
- National Fire Code;
- National Plumbing Code;
- National Farm Building Code; and
- National Energy Codes.

Two types of building construction are considered under the NBC: non-combustible construction and combustible construction. According to the *Centre d'expertise sur la construction commerciale en bois*, non-combustible construction is defined as follows:

³⁶ http://www.nationalcodes.ca/nbc/new_e.shtml (accessed in March 2010).

³⁷ http://www.nationalcodes.ca/nbc/index_e.shtml (accessed in March 2010).

³⁸ Presentation of Denis Bergeron, Director, Codes and Evaluations, National Research Council Canada, to the public hearing of the Standing Senate Committee on Agriculture and Forestry, November 17, 2009.

The type of construction in which a degree of fire safety is attained by the use of non-combustible materials for structural members and other building assemblies. This type of construction therefore requires the use of structural members made of non-combustible materials. Brick, concrete, plaster, metal, glass and stone are considered non-combustible materials. However, a non-combustible construction does not exclude the use of combustible materials, but rather limits their use. Combustible materials are frequently used in this type of construction, in joinery work, interior coating finishing and wooden partition walls.³⁹

Under the NBC, timber and wood-frame construction are considered “combustible” construction.⁴⁰ The NBC limits combustible construction to three storeys high provided the construction is subject to floor area limits. Combustible construction may also be authorized to four storeys provided an automatic sprinkler system is installed, floor area is limited and there is street access and/or a limit on the number of occupants.⁴¹

The NBC thus limits the height of multi-storey wood-frame buildings to four storeys. However, the NBC 2005 contains provisions allowing construction industry professionals to build multi-storey wood-frame buildings of more than four storeys. These professionals must adopt acceptable or alternative solutions and prove to regulatory authorities that their solution provides the same level of performance and meets NBC requirements. The burden of proof is thus on those professionals, who act as pioneers in the field. As a result, additional administrative delays slow start-ups of these types of wood construction, as may be seen from the evidence heard in Committee from the architect of the six-storey wood-frame FondAction building in Quebec City:⁴²

It took a year to get this approval.

By comparison, waiting times with regulatory authorities are much shorter for steel and concrete buildings:⁴³

³⁹

http://www.cecobois.com/index.php?option=com_content&view=article&id=207&Itemid=174
(accessed in March 2010).

⁴⁰

http://www.cecobois.com/index.php?option=com_content&view=article&id=206&Itemid=175
(accessed in March 2010).

⁴¹ Based on the presentation of Denis Bergeron, Director, Codes and Evaluations, National Research Council Canada, to the public hearing of the Standing Senate Committee on Agriculture and Forestry, November 17, 2009.

⁴² Gilles Huot, architect, GHA Architecture and Sustainable Development, as an individual, Evidence, Ottawa, Thursday, March 25, 2010.

⁴³ Ibid.

The time periods are very short — one or two months. When we build something out of concrete or steel, this type of assembly is familiar.

i) Initiatives in British Columbia and Quebec Involving Multi-Storey Wood Frame Buildings of More than Four Floors

Major achievements in the construction of wood buildings across Canada include the Olympic Oval in Richmond, British Columbia, which was the pride of Canadians at the 2010 Olympic Winter Games. That building combines a number of types of materials, including hybrid wood/steel beams.

Two other major innovative projects in recent years have exceeded the four-storey limit set by the NBC for multi-storey wood-frame buildings: the Ellis Building in Kelowna, B.C. and the FondAction Building in Quebec City.

The first initiative was completed in British Columbia even before the government of that province amended its provincial building code in 2009. The six-storey Ellis Court building in Kelowna was designed and constructed according to provincial code requirements and tolerances at that time.⁴⁴ The Ellis Building consists of four “combustible” floors plus a mezzanine on a “non-combustible” basement. Construction was completed in 2007.

In January 2009, the Government of British Columbia approved amendments to the province’s building code to increase the maximum height of wood-frame residential constructions from four to six storeys. The new rule came into effect on April 6, 2009 to allow the province’s residential building sector the necessary time to prepare for the changes.⁴⁵ This provincial initiative thus enabled the architects and engineers operating in that province to build multi-level wood-frame residential constructions to a maximum of six storeys. Furthermore, a study currently sponsored by the BC government would apparently conclude that buildings as tall as 30 storeys could be made almost entirely out of wood (see Sidebar 1).

It should be noted that the BC initiative raised concerns among companies competing with wood over the consultation process that led to the changes to the British Columbia’s building code. Some of the concerns of one representative of the Canadian Institute of Steel Construction (CISC) expressed were as follows:⁴⁶

⁴⁴ <http://www.wood-works.org/BC%20Wood%20WORKS/Six%20Storey%20Wood%20Frame%20Buildings%20in%20BC/History%20and%20Use%20of%20Mid-Rise%20in%20other%20Jurisdictions?Language=EN> (accessed in March 2010).

⁴⁵ http://www.housing.gov.bc.ca/building/wood_frame/index.htm (accessed in March 2010).

⁴⁶ Sylvie Boulanger, Director, CISC Quebec, Director of Sustainable Development, Canadian Institute of Steel Construction, Evidence, Ottawa, Tuesday, March 23, 2010.

What happened in British Columbia is that the usual process was bypassed. It is a government agency that asked that the Building Code of British Columbia allow the use of wood for residential buildings of up to six stories high, rather than four, which is the standard at present, under the National Building Code.

Sidebar 1: Tall timber skyscrapers workable, report says

Buildings up to 30 storeys possible, award-winning architect tells conference.

A study funded by the B.C. government to help promote the province's forestry sector will conclude that buildings as tall as 30 storeys could be made almost entirely out of wood, says an award-winning Vancouver architect leading the research.

Michael Green, who detailed his vision for the world's first "timber skyscraper" during a keynote address last week at a Green Cities conference in Australia, told Postmedia News on Monday that a provincially supported study due to be released later this month will show that such buildings can be cost-saving as well as both fire-and earthquake safe, and that Canada is ideally positioned to lead an emerging global "race" to reinvent the high-rise construction industry - with wood challenging steel and concrete as the ideal building material.

(...)

Source: Extract from Boswell, R. (March 8, 2011). "Tall timber skyscrapers workable, report says", Vancouver Sun, page A1.

Figure 4 – Ellis Building, Kelowna, B.C., under construction – British Columbia’s first six-storey wood-frame building⁴⁷



The second initiative began in Quebec in 2007-2008. FondAction, a unit of the Confédération des syndicats nationaux (CSN) decided to construct a new office building in Quebec City to house its staff. The original idea was to erect a building consistent with FondAction CSN’s values. Consequently, the experts decided on a concept for a green, LEED-certified, wood-frame non-residential building. In 2008-2009, six factors fell into place making it possible to start work on the FondAction Building:⁴⁸

- The Quebec’s government decree favouring the use of timber in public buildings;
- The Quebec government’s adoption of the 2005 National Building Code (innovation and alternative solutions clauses);
- The openness of Quebec’s Régie du bâtiment to analyze various approaches;
- The Quebec government’s strategy on the use of wood in construction (May 2008);
- The Quebec government’s greenhouse gas reduction targets; and
- The founding of Coalition Bois Québec (September 2009).⁴⁹

⁴⁷ <http://www.wood-works.org/BC%20Wood%20WORKS/Six%20Storey%20Wood%20Frame%20Buildings%20in%20BC/History%20and%20Use%20of%20Mid-Rise%20in%20other%20Jurisdictions?Language=EN> (accessed in March 2010).

⁴⁸ Brief (English and French) by Gilles Huot, Architect, at the committee meeting on Thursday, March 25, 2010.

⁴⁹ The Coalition BOIS Québec is an independent organization representing all stakeholders wishing to take action against climate change and to support Quebec’s economy by increasing

CSN's FondAction Building in Quebec City is a six-storey 6,000 m² building whose glulam wood column and joist structure is the highest of its kind in North America. The building is recognized as a non-combustible construction by Quebec's Régie du bâtiment du Québec (RBQ) and was designed by specialists to be LEED-certified and should achieve energy savings in the order of 40 per cent. The building was officially opened on May 11, 2010 in the presence of a number of dignitaries.

Figure 5 – CSN's FondAction Building in Quebec City



Source: Cecobois,
http://www.cecobois.com/repertoire/index.php?option=com_rea&view=fiches&id=224&Itemid=94, accessed in April 2010.

It is important to note that this innovative project would probably not have been possible if RBQ had not permitted the use of “alternative solutions” included in NBC 2005 (objectives-based code). Despite the authority that the provinces and territories hold over building regulations, the testimony by the architect of the FondAction Building demonstrates the importance and influence of the NBC, a Canada-wide model, in the construction of wood-frame buildings even under provincial authority.⁵⁰

the use of wood as a building material. Source: <http://www.coalitionbois.org/en> (accessed in March 2010).

⁵⁰ Gilles Huot, Architect, GHA Architecture and Sustainable Development, as an individual, Evidence, Ottawa, Thursday, March 25, 2010.

The Quebec government then adopted the National Building Code in 2005, maintaining the code's standard parameters, which allow construction professionals to present different approaches to help meet code objectives. As well, Quebec established its construction board, the Régie du bâtiment, to specifically analyze these different approaches.

The following questions arise in light of these two examples of innovative construction projects in two provinces at opposite ends of the country:

- Why are the national, provincial and territorial building codes not harmonized to a greater degree to permit more wood-framed storeys in multi-level buildings?; and
- Why not try to further harmonize the national building codes in the multi-level building construction sector to promote greater use of wood while following the usual science-based consultation process?

Last thing I will address is building codes. You might be aware that British Columbia changed the building code a few months ago to allow buildings greater than four stories to be made of lumber. I do not know about the changes in the building code and there is not a lot of history, but that should be monitored and considered coast-to-coast.

Jon Hobbs, Executive Director, Royal Architectural Institute of Canada

One may wonder why, then, do we have national model construction codes. The key word is uniformity. All provinces agree on the benefits of adopting more consistent building codes and regulations throughout Canada. There is an effort to achieve more consistent levels of building health and safety Canada-wide. Adopting similar requirements throughout the country also helps to expand the market for goods and services.

As for exporting our expertise, our products and our technologies, having consistent codes and regulations across the country clearly gives our methods more international credibility.

Denis Bergeron, Director, Codes and Evaluations, National Research Council Canada

Provinces and territories have authority in the field of building regulations. At the same time, it is desirable for the federal government to exercise management in this field, preferably through an integrated federal-provincial approach. The Committee is convinced that the issue of harmonizing building codes should be on the agenda of federal-provincial meetings as soon as possible. Harmonization in favour of wood would create new opportunities across Canada. One witness mentioned that the market potential of multi-storey, multi-rental, non-residential construction

(buildings of six to 10 storeys which represent the vast majority of construction in Canada) is very promising.⁵¹

Therefore:

Recommendation 6

The Committee recommends that the Department of Intergovernmental Affairs promote the issue of the harmonization of building codes across Canada at federal-provincial ministerial meetings, to facilitate the increased use of wood in the residential and non-residential multi-level construction sector, and remove restrictions on the use of wood.

ii) Maximum Number of Storeys Permitted in the Construction of Wood Framed Buildings in Europe and in the Unites States

Several witnesses told the Committee that a “wood culture” was more advanced in the residential and non-residential building construction sector in Europe, and more particularly in the Scandinavian countries, than in Canada. As such, the Committee thought it would be appropriate to obtain information from the European Centre for Parliamentary Research and Documentation (ECPRD) on the maximum number of storeys permitted in the construction of wood-frame buildings.

At the start of 2010, the Committee received more than 20 responses from ECPRD member countries. The information received enabled it to compare the NBC restrictions on multi-storey wood-frame buildings with those under building codes in effect in certain ECPRD member countries.

That information revealed that the regulations of ECPRD member countries vary to an enormous degree. Some countries set a maximum of two storeys for wood-frame buildings, as in the case of Latvia, Romania and Turkey, while others have no set maximum, as in Germany, Norway and Sweden. Further, other countries, such as Denmark and Finland, appear to have an approach similar to that of Canada as a maximum of four storeys is allowed for wood-frame buildings, although variances may be obtained in order to build higher.

Since the Scandinavian countries seem to have greater know-how in the field of wood construction, it was appropriate to provide a more detailed description of the situation prevailing in those countries with respect to multi-storey wood-frame buildings. A more detailed description of the United Kingdom’s regulations is also

⁵¹ Adapted from the evidence of Richard Desjardins, Manager, Building Systems, FPInnovations, Ottawa, September 29, 2009.

provided as those regulations contain useful information for the use of wood in multi-storey buildings.

In Norway, there are no restrictions on the maximum number of storeys allowed for wood-frame buildings.⁵² All buildings must meet the standards prescribed by law in that country (*Technical Regulations under the Planning and Building Act 1997*). In 2001, the National Office of Building Technology and Administration designated the *Norsk Treteknisk Institutt* (NTI) as the country's agency for inspecting, testing and certifying load-bearing wood beams and construction materials such as panels. NTI is currently taking part in a project to construct a 17-storey wood-frame building (the Barentshuset), the tallest such building in the world.⁵³ The project is located in the Arctic city of Kirkenes, a hub for regional relations between Norway and Russia. The building will have an area of 10,000 m² and will be a centre for cultural and innovation exchange between Norway and Russia.⁵⁴ Norway currently has no policies establishing maximum wood content in government building construction projects. However, the use of wood is encouraged, and NTI has developed a guide that the municipalities may use in considering the use of wood in municipal buildings.

In Sweden, there are no regulations concerning the maximum number of storeys that a wood-frame building may have. The national building codes of that country are based on performance, not objectives, as is the case in Canada.⁵⁵ If national codes are complied with, there is no limit on the use of wood frames in multi-storey buildings.

In Denmark and Finland, the maximum number of storeys for wood-frame buildings is four. In Finland, regulation 1.3.1 of the national code (E1),⁵⁶ which concerns the verification of fire requirements, grants permission to build wood-frame residential and office buildings to a height of four storeys. However, under regulation 1.3.2 of the Finland national code (E1), it is possible to build more than four storeys by meeting the prescribed criteria. At the time of writing this report, there were no wood-frame buildings of more than four storeys in Finland. In Denmark, it is also possible to obtain variances from regulatory authorities to construct wood-frame buildings of more than four storeys.

In the United Kingdom, current British standards for wood-frame construction permit up to a maximum of seven storeys. However, regulatory standards discourage the use of combustible construction materials for buildings more than 18 metres

⁵² Information received from the Norwegian Parliamentary Research Service in March 2010.

⁵³ <http://www.reiulframstadarkitekter.no/reiulframstadarkitekter/projects.asp?menu=projects&IDwork=135&submenu=&tittel=BARENTSHUS> (accessed in March 2010).

⁵⁴ <http://www.reiulframstadarkitekter.no/reiulframstadarkitekter/projects.asp?menu=projects&category=culture&submenu=&IDwork=135&page=2&IDimage=943#> (accessed in March 2010).

⁵⁵ An objective-based (or normative) requirement describes the means to achieve the objective in terms of materials and technology, while a performance requirement describes ends in terms of performance that will assure meeting the objective. Source: <http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/ir/ir697/ir697.pdf> (accessed in April 2010, available in English only).

⁵⁶ Information received from the Parliament of Finland on February 19, 2010.

high, although regulatory authorities permit higher buildings provided fire safety precautions are put in place. The United Kingdom currently has no policy setting the minimum wood content of government building construction projects. However, the British government encourages the use of “green” building materials in residential construction through a code that sets environmental standards and thus favours the use of wood.⁵⁷

As in Canada, the United States has a model building code: the International Building Code (IBC). The IBC is developed by a private, non-profit organization called the International Codes Council, with the voluntary involvement of various stakeholders in the U.S. construction industry. These volunteers make amendments to the IBC every three years and work on 12 other codes, including a new green building code.

The states and local jurisdictions have no obligation to adopt the IBC. They are therefore free to amend the model building code in accordance with locally prevailing conditions.⁵⁸ Once again, the Committee finds that the IBC is more permissive than the NBC with regard to multi-storey wood-frame construction.

Table 6 provides an overview of the maximum number of storeys permitted for wood-frame buildings in the ECPRD member countries and the United States. One question emerges from this information and from the evidence received in Committee: **why doesn't Canada, which is a land of forests, do more through its NBC to promote the increased use of wood in the multi-storey building construction sector?**

⁵⁷ Information received from the Library of the House of Commons of the United Kingdom. The Code for Sustainable Homes: Setting the Standard in Sustainability for New Homes, February 2008. Source: <http://www.communities.gov.uk/publications/planningandbuilding/codesustainabilitystandards> (accessed in April 2010).

⁵⁸ Information taken from the evidence of Robert Glowinski, President, Forestry and Wood Products, American Wood Council, May 6, 2010.

Table 6 – Maximum number of floors permitted for wood-frame buildings in certain member countries of the European Centre for Parliamentary Research and Documentation and the United States

Country	Maximum number of storeys	Description/details
Croatia	No limits.	Buildings must meet prescribed characteristics.
Czech Republic	No regulations on the construction of multi-storey wood-frame buildings.	There are limiting factors: fire safety, elevator locations, acoustic issues, etc.
Denmark	Maximum 4 storeys.	It is possible to apply for a variance to build higher.
Estonia	Maximum 4 storeys.	A combination of various factors usually limits the number of storeys to one or two.
Finland	Maximum 4 storeys.	However, regulation 1.3.2 of Finland's building code permits more than 4 storeys for wood-frame buildings. The tallest wood-frame building in Finland is currently 4 storeys high.
Germany	No set maximum.	The country has fire specifications.
Greece	No limits.	---
Hungary	No regulations.	No regulations for wood-frame buildings.
Latvia	Maximum 2 storeys.	Regulation no. 866.
Norway	No restrictions or special regulations on the number of wood-frame storeys.	Regulatory technical standards under the <i>Planning and Building Act 1997</i> . Buildings more than nine metres high (regardless of material used) must be constructed in an area zoned for tall buildings. Project involving a 20-storey wood-frame building (tallest in the world). The use of wood in government buildings is encouraged, but there is no public policy to that end.
Poland	No regulations on the maximum number of storeys.	---
Portugal	No specific legal references on the subject.	Wood-frame buildings must comply with law no. 235/83 and law no. 220/2008.

Romania	No more than 2 storeys (ground and second floors).	If the ground floor is built of masonry, the regulations permit two wood-frame storeys.
Russia	No provisions in the legislation regulating the matter.	---
Slovak Republic	No restrictions.	Restrictions do not depend on the type of material. All types of construction must meet the same six criteria.
Sweden	No regulations on the number of storeys for wood-frame buildings.	Sweden's national codes are performance-based. If the codes are complied with, there are no limits on the use of wood frames.
Turkey	Maximum 2 storeys to a maximum height of 6.5 metres.	---
United Kingdom	Maximum 7 storeys.	However, British construction regulations discourage the use of combustible materials in buildings more than 18 metres high. On the other hand, it is possible to build higher if adequate fire prevention measures are put in place.
United States	Maximum 5 storeys if the building is not equipped with automatic sprinklers. Maximum 6 storeys if the building is equipped with automatic sprinklers.	The International Building Code acts as a model code in the United States. It is amended every three years. There are some restrictions on wood buildings related to floor area and occupant load and type.

Source: Information received from the member countries of the European Centre for Parliamentary Research and Documentation, January to March 2010, and summary of the evidence of Robert Glowinski, President, Forestry and Wood Products, American Wood Council, Ottawa, May 6, 2010.

The example I will give is this: Recently in B.C., there has been a lot of buzz because our code has allowed us to move to six-storey wood-framed buildings, and there is great enthusiasm. I happened to be in Japan with my eight-year-old when I received the news that the change had gone through, and all that enthusiasm came through from my office in an email.

I responded to say that I had just walked out of a building in Nara, Japan. In 2009, our new code allows us to build wood-frame buildings 50-60 feet tall. The building in I had just walked out of was 187 feet tall, built in the seventh century and made entirely of wood with very few metal connectors. We were constructing buildings 1,400 years ago that are more than three times the height of what our new code, and all the enthusiasm about our new code, allows us to do today.

At the rate of sustainability, it will be probably 50 years behind by the time they catch up to the changes in the design industry. It is a proscriptive system limiting wood use, which is being challenged by my previously noted integrated design approach. As a group of consultants with a common goal, we work around the code. There is a new industry of code consultants that we use to help us cope with the challenges of building in wood.

Larry McFarland, Architect, as an individual

I would suggest that governments need to show leadership in directing professionals in those areas to develop the codes and the applications that will make better use of Canadian resources. There is much more capacity to use wood in construction, whether it be residential or commercial.

Robert Pinette, Vice-President of Woodlands, J.D. Irving Limited

A nine-storey building is not unthinkable. It is a matter of, with new knowledge and new technologies, demonstrating that these buildings provide a level of performance and safety that meets the minimum upon which the stakeholders have agreed. Codes exist to set a bar, and they are based on consensus.

Denis Bergeron, Director, Codes and Evaluations, National Research Council Canada

In addition, when the Committee asked the President of George Third & Son Ltd., a major steel structure manufacturer in Canada, and the President and Chief Executive Officer of the Maritime Lumber Bureau whether amending the NBC to permit the construction of wood-frame buildings of more than six storeys would help increase competition in the construction industry or solve problems in the forest industry, they answered as follows:

Yes, it would. As you rightly said, the National Building Code specifies four-storey sprinklered facilities. Provinces such as British Columbia and Quebec have overruled the National Building Code; they have adopted it but they have additional provisions that permit up to six storey sprinklered buildings.

Diana Blenkhorn, President and Chief Executive Officer, Maritime Lumber Bureau

The Committee heard testimony suggesting amendments could be made to the NBC to enable professionals to construct multi-storey wood-frame buildings of seven floors, as is the case in the United Kingdom, without seeking variances from the code. By adopting this approach, Canada could position itself as a North American leader. However, these changes to the NBC should be made on a solid scientific basis and through the customary consultation process.

Furthermore, the National Research Council Canada should accelerate its research to assess the possibility of constructing wood-frame buildings of more than four storeys, as is the case in many European countries. The architect of the FondAction Building in Quebec City provided the following evidence on the information contained in the NBC for multi-storey wood-frame buildings:

The main problem has to do with the codes. There is a huge lack of information in the codes for designing this type of project. There are very few professionals who are qualified to design this type of structure. [...]In Code O86, the design code for wooden structures, there is no information on the behaviour or fire resistance of wood decking. That does not exist in the code. We used Code O86 from 2001. They are working on 2011, 2009 has been published, but it was not integrated into the 2005 code. There is always a gap of three, four or eight years between what is written in the codes and what is implemented. We are always behind. I have no solution for this problem, but I wanted to mention it. There is no information in the code about calculating deformations due to wood shrinkage or creep, particularly for fibres. There is no information about that. Concrete's required load-bearing capacity during a fire is clearly defined; it is known how the structure will hold up after an hour. This information does not exist for wood. There is also no method for calculating the capacity of a wooden diaphragm of glue-laminated panels such as we used.⁵⁹

I would say there would be a possibility of more competition in the steel industry in a six- or eight-storey structure than there is now. Presently, it is between two building materials: Steel or concrete. Now if it is steel, wood or concrete...Competition is good.

Rob Third, President, George Third & Son Ltd.

⁵⁹ Gilles Huot, Architect, GHA Architecture and Sustainable Development, as an individual, Evidence, Ottawa, Thursday, March 25, 2010.

Therefore:

Recommendation 7

The Committee recommends that, by 2015, the Minister of Industry, through the National Research Council Canada:

- **conducts or subcontracts research work and validates international technical research to make the necessary information available to architects, engineers and construction professionals for the construction of multi-storey wood-frame buildings of more than four storeys; and**
- **fosters a consensus among provincial and territorial partners to amend the National Building Code to permit the construction of multi-storey wood-frame buildings to a maximum height of seven storeys.**

iii) A Fifth Objective in the National Building Code?

Not only can timber frame reduce carbon footprint but research has shown that using timber also helps to save energy over the life of the building as it provides excellent thermal insulation. In fact, timber is 15 times more efficient than concrete, 400 times better than steel and 1,700 times better than aluminum.

Gerrie Doyle, President, Ontario Association of Architects

I think you also know that wood has some huge advantages in terms of energy efficiency, and also in terms of thermal mass. This is particularly important in that buildings are responsible for a very significant portion — some say up to 48 per cent — of greenhouse gases.

André Bourassa, Architect and President, Ordre des architectes du Québec

According to a study published by the Commission for Environmental Cooperation (CEC) in 2008, commercial and residential building operations account for about 20 per cent of Canada's energy consumption. Moreover, in North America these operations account for 20 to 25 per cent of landfill waste and 5 to 12 per cent of

water consumption.⁶⁰ With respect to greenhouse gas emissions, these buildings in North America are the source of more than 2,200 megatonnes of CO₂ annually, 35 per cent of continental greenhouse gas emissions.

Since trees sequester carbon, thus reducing greenhouse gas emissions, and wood is a recoverable and renewable material with recognized energy efficiency benefits, the Committee thought it appropriate to examine the possibility of adding a fifth objective to the NBC: reducing the environmental footprint of buildings in Canada.

- ***Energy Consumption of Commercial and Institutional Buildings***

As heard in witness testimony, changes to national building codes are thought to be effective in achieving energy efficiency gains.⁶¹ Amendments to building codes are even considered to be responsible for the significant improvements in building energy performance between 1980 and 2000 in the developed world.

Currently in Canada, the NBC does not address energy efficiency. However, the Model National Energy Code for Buildings (MNECB) was published in 1997 as a voluntary federal standard.⁶² The question thus arises as to why the MNECB was not integrated into the NBC and has not become a mandatory regulatory measure in view of the significance of the environmental footprint of commercial and institutional buildings.

According to the Commercial and Institutional Consumption of Energy Survey (CICES) published by Natural Resources Canada in 2007,⁶³ there are 440,863 establishments in the commercial and institutional sector in Canada. In 2005, these establishments consumed a total of 1.04 billion gigajoules (GJ) of energy, whereas Canada's total energy consumption, as reported by Statistics Canada, was 7.69 billion GJ.⁶⁴

This figure of 1.04 billion GJ represents the annual energy consumption of approximately nine million households in Canada, 13.5 per cent of Canada's total energy consumption. By comparison, in 2008, the residential sector accounted for 1.36 billion GJ, which represented 17.5 per cent of Canada's energy consumption.⁶⁵

⁶⁰ http://www.cec.org/Storage/64/5841_GB_Report_EN.pdf.

⁶¹ http://www.rand.org/pubs/technical_reports/TR728/.

⁶² <http://www.nrtee-trnee.com/eng/publications/commercial-buildings/commercial-buildings-report-eng.pdf>, p. 34.

⁶³ <http://oee.nrcan.gc.ca/publications/statistics/cices06/pdf/cices06.pdf> (accessed in April 2010).

⁶⁴ Statistics Canada, Table 128-0009, Supply and demand of primary and secondary energy in terajoules, annually (Energy consumption and disposition) (accessed in April 2010).

⁶⁵ CANSIM Table 128-0009.

Total average energy intensity (see Table 7) by floor area of commercial and institutional establishments was on average 1.54 GJ/m². The five types of commercial and institutional establishments with the highest total energy intensity were: food services and drinking places (3.06 GJ/m²), hospitals (2.83 GJ/m²), food retail stores (2.78 GJ/m²), universities (2.59 GJ/m²)⁶⁶ and “other”, which includes among others, arts, entertainment and recreation (1.78 GJ/m²).

Table 7 – Energy consumption and energy intensity in the commercial and institutional sector in Canada, 2005

Sector	Number of establishments	Consumption (GJ)	Energy intensity (GJ/m ²)
Wholesale and warehousing	45,868	114,162,037	1.55
Retail	97,265	146,861,780	1.74
Information and cultural industries	8,429	25,589,044	1.52
Offices (excluding public administration)	86,531	98,417,673	1.42
Public administration	6,329	35,305,615	1.22
Education	16,512	212,807,311	1.35
Health care	47,001	101,035,185	1.75
Accommodation services	5,887	45,843,413	1.88
Food services and drinking places	37,932	42,222,892	3.06
Religious organizations	24,451	50,605,742	1.08
Other	64,658	122,518,056	1.78
Total	440,863	1,036,777,949	1.54

Source: <http://oee.nrcan.gc.ca/publications/statistics/cices06/index.cfm?attr=0>

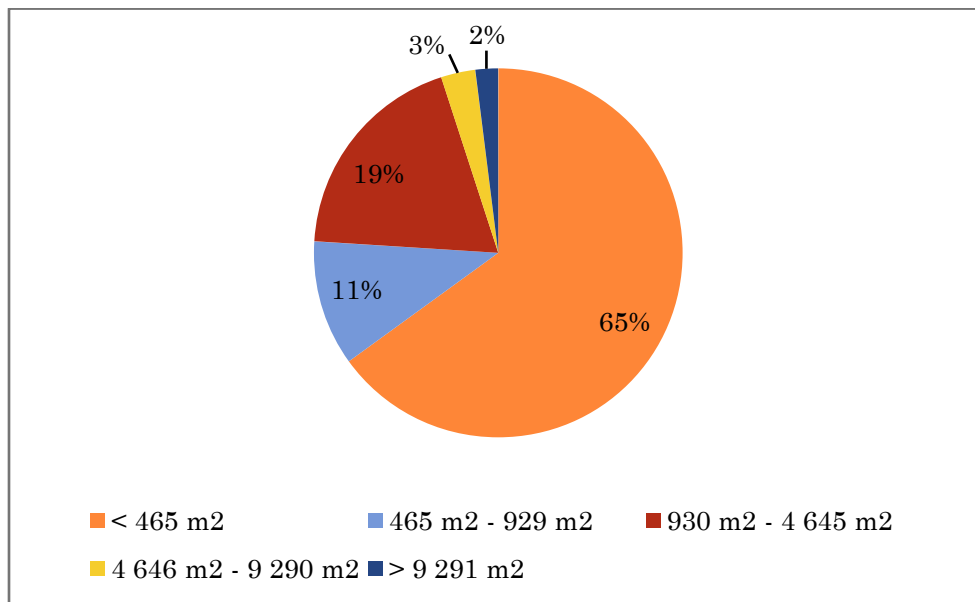
The energy intensity of commercial and institutional establishments in the Prairies Region is the highest, with an average of 1.74 GJ/m², followed by Ontario (1.71 GJ/m²) and British Columbia (1.56 GJ/m²). The Atlantic Region (1.14 GJ/m²) and Quebec (1.26 GJ/m²) have the lowest energy intensity per square metre of floor area in Canada.

⁶⁶ Included in Education.

The survey also establishes a correlation between the year of construction and the energy intensity of establishments in Canada. In 2005, the average age of establishments in Canada was 30 years. Establishments built from 2000 to 2004 had the lowest energy intensity (1.30 GJ/m²), followed by those built before 1920 (1.39 GJ/m²), whereas those constructed between 1960 and 1969 had the highest energy intensity (1.80 GJ/m²) of the categories studied. In addition, it is estimated that commercial buildings are renovated on average every 20 years.⁶⁷

From the standpoint of floor area, buildings with more than 9,290 m² represent only two per cent of commercial and institutional establishments in Canada, but consume 54 per cent of total energy (see Graph 11 and Graph 12). Education, hospitals, offices, establishments in retail trade, wholesale and warehousing are examples of large area establishments.

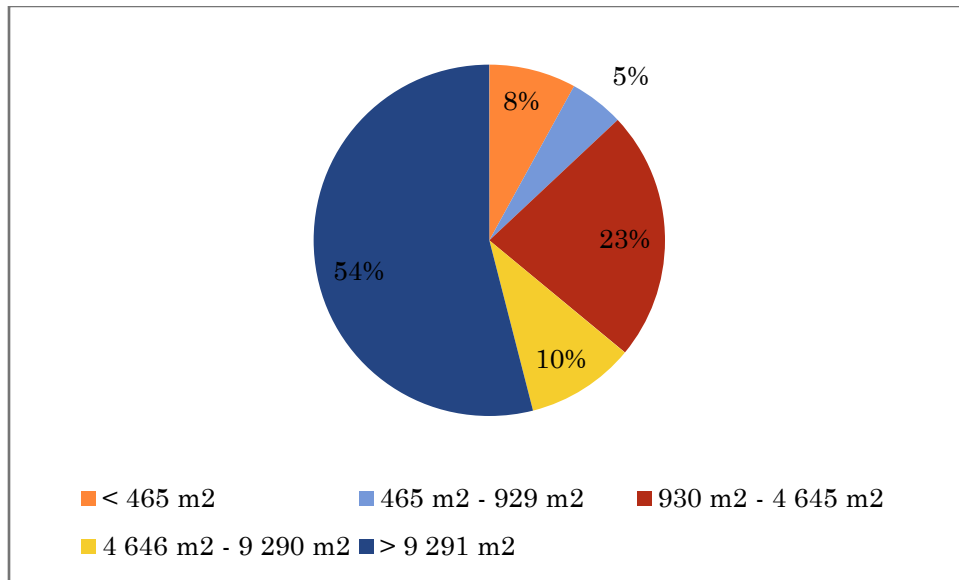
Graph 11 – Distribution of commercial and institutional establishments by floor area



Source: <http://oe.nrcan.gc.ca/publications/statistics/cices06/pdf/cices06.pdf>

⁶⁷ <http://www.nrtee-trnee.com/eng/publications/commercial-buildings/commercial-buildings-report-eng.pdf>.

Graph 12 – Energy consumption by floor area of the establishment



Sources: <http://oee.nrcan.gc.ca/publications/statistics/cices06/pdf/cices06.pdf>

- ***Climate Change and Other Environmental Factors***

As noted above, the North American commercial and residential building sector generates more than 2,200 megatonnes of CO₂ annually, 35 per cent of continental greenhouse gas emissions. In addition, numerous studies and evidence provided to the Committee tend to prove that an increase in building energy efficiency cuts greenhouse gas emissions.

The Committee is of the view that using wood as a building material can not only help achieve energy savings, but can also contribute to reducing Canada’s greenhouse gas emissions, as well as improve the environmental footprint of buildings.

A study by the Canada Wood Council⁶⁸ based on life cycle analysis (LCA) and comparing the environmental impact of a typical wood-frame residence to that of similar residences built with steel and concrete, concludes that:

⁶⁸ Life cycle analysis (LCA) is a tool used to assess the potential environmental impact of cost savings on the life of a product, a building, a process or an activity throughout its life cycle by quantifying the use of resources (“inputs” such as energy, raw materials and water) and environmental emissions (“outputs” in the air, water and soil) associated with the system assessed.

- Steel and concrete consume respectively 12 per cent and 20 per cent more energy than wood;
- Steel and concrete emit 15 per cent and 29 per cent more greenhouse gases than wood construction;
- Steel and concrete generate 10 per cent and 12 per cent more air pollutants than wood construction; and
- Steel and concrete generate 300 per cent and 225 per cent more water pollutants than wood construction.⁶⁹

[With respect to the idea of introducing a fifth objective: reducing the environmental footprint of building materials] Everything is possible if there is consensus among the stakeholders and governments that the national model code is the proper vehicle for this. Using the rigour and discipline of the process, it is possible to think that something such as this could be discussed. The objectives you stated are those of the National Building Code of Canada. We are working on energy efficiency requirements for houses and for larger buildings, so soon there will be a fifth objective of the building code with respect to energy efficiency. We are no longer talking about the safety and health of people and the protection of buildings; we are talking about an economic objective or an environmentally driven objective.

The next objective, which we are starting to discuss with the provinces, is water-use efficiency. This shows how responsive to needs the system can be. If the provinces agree that a regulatory need exists for which the best vehicle is the national model codes, this is possible.

Denis Bergeron, Director, Codes and Evaluations, National Research Council Canada

If legislation and regulation required the lowest carbon footprint, then it would automatically direct it to wood.

Diana Blenkhorn, President and Chief Executive Officer, Maritime Lumber Bureau

⁶⁹ http://www.cwc.ca/NR/rdonlyres/936E8451-8FA4-41A1-99BA-22C78B3A36CC/0/Quickfacts_Sustainable_Building_Series_04.pdf

I believe the best way to promote wood construction is by requiring buildings — ideally all, but at least federal buildings — to reduce their carbon footprint. You will push the design industry to think about the right material to be used.

Larry McFarland, Architect, as an individual

Therefore:

Recommendation 8

The Committee recommends that, by 2015, the Minister of Industry, through the National Research Council Canada, foster a consensus among the various advisory committees on the addition of a fifth objective to the National Building Code. This objective would concern the environmental footprint of residential and non-residential buildings and focus on:

- a) Increasing energy efficiency by integrating the standards of the Model National Energy Code of Canada for Buildings (MNECB) into the National Building Code; and**
- b) Reducing greenhouse gas emissions.**

CHAPTER VI: USING FOREST BIOMASS TO PRODUCE ENERGY

There has to be a balance. I am quite certain that if we remove all the biomass and leave the ground completely bare, we will run foul of the environmental movement. We have to harvest it on a smart scale if we are to avoid renewed conflict with environmentalists.

Guy Chevrette, President, Chief Executive Officer and Communications Director, Quebec Forestry Industry Council

Producing energy from forest biomass is an interesting possibility for pulpwood and forest residue, which are currently underused in the forest industry. Forest residue is often buried or burned on-site, and wood of no commercial value is often discarded at the side of logging roads.

However, as this chapter will show, using forest biomass to produce energy is not a miracle cure that will propel the industry out of crisis. As mentioned in Chapter 1, all forest policies must find a balance between the economic, social and ecological roles of the forest. Using forest biomass to produce energy has economic, social and ecological considerations that must be weighed carefully. These three aspects were discussed in-depth by witnesses appearing before the Committee, and are each addressed in this chapter.

1. The ecological, economic and social considerations of energy production and how they apply to forest biomass

a) Ecological Considerations

Environmental concerns over burning fossil fuels, particularly the emission of greenhouse gases, have led to renewed interest in using biomass to produce energy. When considering this process, issues of energy return on investment, energy efficiency and environmental benefits need to be taken into account.

i) Energy Return on Investment

Is a lot of energy required to transform it into a useful energy source? For example, 20 percent of a wood pellet's energy, about a fifth of its volume, is used to compress it and dry it out to the point of being a pellet [...].

Trevor Hesselink, Director, Forests Programs, Canadian Parks and Wilderness Society

The biggest costs relate to the harvesting, collection and transportation, which is dispersed. It takes many trucks to do that collection and distribution whereas coal comes in one large ship or one train, which tends to be much more economical.

**Cara Clairman, Vice-President, Sustainable Development, Ontario Power Generation,
Canadian Electricity Association**

The concept of energy return on investment is similar to that of a return on investment (ROI) in finance, but it deals with energy instead of money.⁷⁰ Energy return on investment (EROI) can be defined using the following equation:

$$EROI = \frac{\text{Total energy produced}}{\text{Total energy consumed during the energy production process}}$$

Energy cannot be generated without first being expended. Therefore, the concept of energy return on investment is used to determine the relationship between the amount of energy consumed throughout the entire production process and the final amount of energy generated. In the above equation, an EROI value greater than 1 is the minimum desired result, as it means that the total amount of energy produced is higher than the total energy consumed during the process.

In the case of using forest biomass (e.g., wood chips) to produce heat or electricity, the amount of energy output would be the energy produced by the biomass as it is burned. This figure would be the numerator in the EROI equation. The amount of energy used to supply and process the biomass would be the denominator in the EROI equation. For example, the energy used to cut down trees, process them into wood chips and transport them to the production site where they will be used to produce heat or electricity would be recorded as the EROI denominator.

In the business world, the goal is to maximize the financial return on investment. Similarly, the goal in the energy sector is to maximize the energy return on investment. An EROI well above 1 indicates that a relatively small energy investment can produce a very large amount of energy.

Using sawmill residue to produce energy at the production site maximizes the EROI for forest biomass. This approach uses significantly less energy than if the biomass is gathered from a forest a great distance from the power plant. Collecting forest biomass directly from the forest requires significant energy input in terms of cutting, grinding and transporting the wood to the power plant.

⁷⁰ P. Déry. Quel rendement sur notre investissement énergétique? Groupe de recherches écologiques de La Baie. February 2008.

ii) *Energy Efficiency*

Yes, we can convert trees into liquid fuels, but the amount of energy recovered and the subsidization by taxpayers to develop this end-use pathway indicate that it is the least viable strategy, both financially and in terms of energy output, for producing energy from the forest sector.

A cellulosic ethanol or a bio-oil fuel cycle only recovers about 50 per cent of the energy found in wood. In contrast, direct wood biomass use in heat applications and combined heat and power applications can recover 75 per cent to 85 per cent of the energy to displace fossil fuels. A dedicated biomass power plant, or co-firing biomass with coal, results in about 25 per cent to 30 per cent conversion efficiency.

Roger Samson, Executive Director, Resource Efficient Agricultural Production (REAP)

Within that one sub-criterion of application efficiency, there is an array of efficiency levels, ranging from 75 per cent on the process heat side, all the way down to the 20 per cent range for a 20-megawatt power plant that is just producing electricity.

Trevor Hesselink, Director, Forests Programs, Canadian Parks and Wilderness Society

Energy efficiency is a complementary concept to EROI, as it determines the efficiency of the combustion process. Energy efficiency can be defined as the ratio between the useful output of a machine and the input required to make it run.⁷¹ Energy efficiency can be expressed by the following mathematical equation:⁷²

$$\text{Efficiency} = Q / \text{energy}$$

Where “Q” is the useful heat produced by the system (in joules) and “energy” is the amount of energy (in joules) required to make the system run.

The concept of energy efficiency is very important when considering the use of forest biomass to produce energy. “Useful heat” is heat that is not “lost” in the atmosphere but can instead be used for heating, producing electricity, cooking, etc. Heating systems powered by biomass are generally very efficient, as most of the heat output can be used for space heating.

Burning biomass to produce electricity results in a relatively low output because a large amount of heat energy is lost during the production process. There are many

⁷¹ Source: <http://www.techno-science.net/?onglet=glossaire&definition=3373> [French only]

⁷² Source: <http://www.techno-science.net/?onglet=glossaire&definition=3373> [French only]

ways this lost heat can be used, which increases the efficiency of a biomass electricity production system. For example, a combined heat and power (CHP or cogeneration) system generates electricity and captures the by-product heat to be used for space heating. CHP systems are becoming more and more popular in the pulp and paper industry.

Some by-products of this industry have a high energy content and can be used to produce heat (for heating of production facilities, for example) and electricity. The production facilities can use the electricity and sometimes sell any surplus power back to the local power grid.

The important point to note here is that, from an environmental point of view, it is preferable to optimize the energy efficiency of an energy production system, as the same energy input then yields a higher output.

iii) Environmental Benefits

We are a bit worried that the enthusiasm for biomass production could be an ecosystem disaster if we sweep up every bit of stored carbon from the forests in order to burn it in the name of the environment. However, if it were just using the waste stream, so responsible biomass production, we could output the equivalent of another six nuclear reactors and it would be economic.

Avrim Lazar, President and Chief Executive Officer, Forest Products Association of Canada

One trend in the United States is that targeting the top in limb wood and with all the foliage you have a dramatically higher ash and mineral and nutrient content in the outer limbs where all the photosynthesis is happening, which is where all the nutrients are being diverted for growth. You want that material in the forest soil, and not in a boiler system. It causes slagging, fouling and technical issues of corrosion inside combustion systems, and creates mechanical operational issues of forming essentially glass in your boiler grates, large clinkers or moon rocks.

Adam Sherman, Program Director, Biomass Energy Resource Center (BERC)

The environmental benefits of energy production refer mainly to minimizing the negative environmental impact of energy production. All energy production technologies, whether considered clean or not, have a negative effect of some kind on the environment. For example, fossil fuel energy produces greenhouse gases. Burning coal and forest biomass produces microparticles, which have a negative

external effect on human health. Even clean energies have an impact on the environment: for example, many people believe that the wind turbines used to produce wind energy are a source of visual and noise pollution and have a potentially harmful effect on birds.

Thus, it is more a question of finding energy sources that minimize environmental impacts, rather than trying to find energy sources with no environmental impacts. In this regard, producing energy from forest biomass has a far smaller environmental impact than producing energy from fossil fuels. However, some have raised questions about the negative human health impact of microparticles, a by-product of the biomass combustion process. Notwithstanding this, a general consensus exists to say that biomass combustion has far fewer negative environmental effects than fossil fuel combustion.

b) Economic Considerations

I am a capitalist at heart. I think if something is not making it without a government subsidy, then unfortunately it should not make it.

Chadwick Wasilenkoff, Chief Executive Officer, Fortress Paper

i) Economic Efficiency

Energy is needed for extracting, producing and processing natural resources and for industrial production. Wood is a great example. Significant amounts of energy are needed to cut down, transport and process wood. As economic efficiency refers to the highest yield at the lowest unit cost, having low energy costs increases economic efficiency.

From a strictly economic perspective, it is important to encourage economic efficiency by developing the cheapest energy sources first. A market driven by supply and demand usually favours energy sources that are the most economically efficient. For example, solar power can seem to be nearly perfect according to some criteria: solar panels are a source of clean energy, they do not produce any noise or emissions and they have a low visual profile (when installed on house roofs).

However, solar power is currently considered to be economically inefficient. The only way to ensure that solar energy is developed on a large scale in Canada is to guarantee long-term subsidies. These subsidies could take the form of prices that are

guaranteed at 10 to 20 times the economic cost of generating electricity from coal, which is what Ontario has done.⁷³

The concept of “energy on demand” is closely linked to economic efficiency as well and has to do with the reliability of supply. Energy demand fluctuates considerably in a 24-hour period: it is usually high during the day (when most residents are at work and industries are running at full capacity) and low at night. An energy source available “on demand” can adjust to consumer fluctuations. For example, biomass and fossil fuels, particularly natural gas, are seen as sources of electrical power that can adjust as needed. However, other sources, such as wind and solar energy, are intermittent and therefore unable to respond to fluctuations in demand throughout the same day.

This is an important consideration when comparing the economic efficiency of various energy sources. When considering intermittent energy sources, it is important to take into account not only the average cost of generating electricity, but also the cost of maintaining a backup energy source to be used when the intermittent source is unable to meet consumer demand.

Furthermore, the backup source must be able to meet the full installed electrical generating capacity when there is almost no wind to power the turbines or sunlight to power the solar panels.

Another problem for us is the current low price for fossil fuels, especially natural gas. I will be honest with you; for our industry, oil at \$140 a barrel is a stimulus, whereas at \$60 a barrel it is not, and with natural gas at current prices, we cannot compete in economic terms.

**John Arsenault, Director, Vice-President, Quebec Operations Energen Pellet Fuel Inc.,
Wood Pellet Association of Canada**

⁷³ The economic cost of generating electricity from coal in Ontario is estimated at 3.7¢/kWh. The Ontario FIT program guarantees a price ranging from 44.3 to 80.2¢/kWh (depending on the type of facility) for electricity produced by solar panels. For more information about the program, visit: <http://www.sustainableprosperity.ca/files/SP%20Policy%20Brief%20-%20Ontario%20FIT.pdf> and [http://fit.powerauthority.on.ca/Storage/30/10147_FIT_Stakeholder_Engagement_-_Session_4_FIT_Price_Schedule_FINAL_\(HP\).pdf](http://fit.powerauthority.on.ca/Storage/30/10147_FIT_Stakeholder_Engagement_-_Session_4_FIT_Price_Schedule_FINAL_(HP).pdf).

Unless one has ready access to large quantities of low-priced wood waste, which is a rare circumstance, electricity produced from biomass is more expensive than electricity produced from coal or gas.

[A] better comparison might be with other renewables. When you do that, the price [of biomass energy] is much more competitive.

Cara Clairman, Vice-President, Sustainable Development Ontario Power Generation, Canadian Electricity Association

[B]iomass is bulky, wet and distributed, and petroleum is cheap and dense and comes from a pipe.

Lorne Morrow, Chief Executive Officer, Centre for Research and Innovation in the Bio-Economy (CRIBE)

Market forces leave very little room—other than for niche applications—to produce electricity from an economically inefficient source like solar panels. Forest biomass is generally considered more economically efficient than other renewable energy sources (with the exception of large-scale hydroelectric dams). However, as a number of witnesses indicated in committee, it is currently more expensive to produce energy, especially electricity, from forest biomass than from fossil fuels.

From a strictly economic perspective, developing biomass as an energy source would probably have a very limited scope in Canada, unless the price for competing energy sources like coal, natural gas and oil were to increase dramatically. Coal is traditionally the most affordable source of per unit energy, which explains its popularity worldwide.

ii) Efficient Resource Allocation Within the Forest System

In some cases, three separate operators are harvesting the same lumber. This is not cost-effective and kills profits. [...] Biomass transportation must be integrated with the initial harvesting operation. Any failure to do so will undermine the industry.

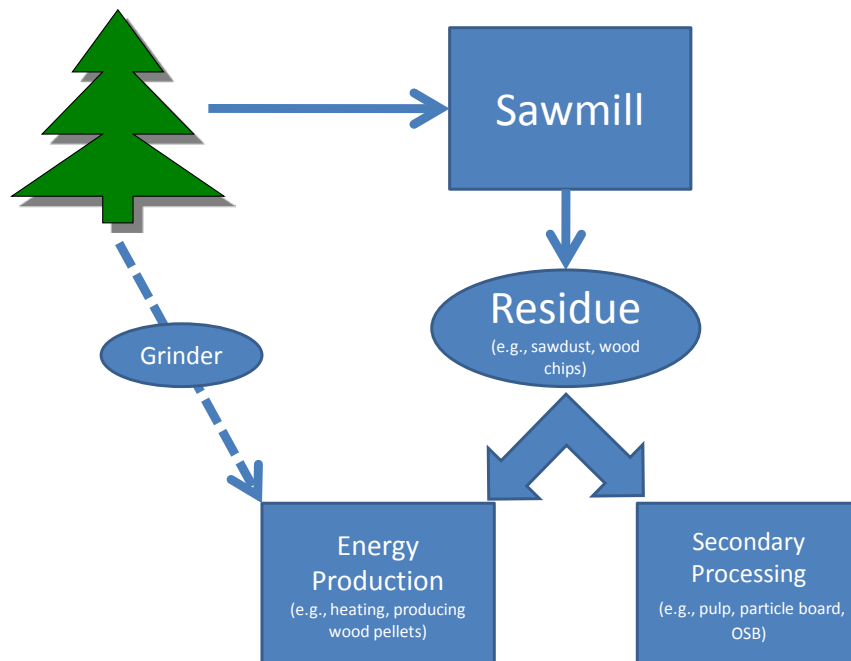
Guy Chevrette, President, Chief Executive Officer and Communications Director, Quebec Forestry Industry Council

When examining the effectiveness of forest biomass as an energy source, we should consider it from the perspective of the forest system and keep in mind the principles laid out in Chapter 1 regarding the economic role of the forest:

- alternative uses are possible for the same fibre, which can create competition for access to the resource;
- the sub-sectors of the forestry industry are often complementary; and
- there are many alternative uses for by-products of primary and secondary processing, which can create competition between users or lead them to integrate vertically to control access to raw materials (e.g., a paper mill buys a sawmill to control its supply of wood chips).

The previous section examined economic efficiency in the energy system as a whole, that is, forest biomass compared with other energy sources. It concluded that forest biomass is generally considered less economically efficient than fossil fuels as a source of energy. However, if the government decided to make biomass competitive by offering subsidies, the Canadian forest industry would be greatly affected. Figure 6 shows the supply chain for generating energy from forest biomass. There are two main sources of forest biomass: sawmill residue and cutting areas.

Figure 6 – Generating energy from forest biomass: supply chain



In the forest system, economic factors rather than environmental or social factors usually determine whether or not biomass is used to produce energy. For example, if there is an economic advantage to drying wood using sawmill residue as fuel instead of oil because oil prices are up, we can expect that sawmills will prefer to use biomass. Similarly, if it is more profitable to use sawmill residue such as woodchips and sawdust to make bound residue board, particle board or pulp, these uses will take precedence over energy production.

Providing government subsidies to increase the use of forest biomass as an energy source could have a significant influence on how resources are used in the forest sector. It may be more profitable to use sawmill residue with the help of these subsidies, thus turning these residues into an energy system, but the pulp and paper and particle board industries would suffer as a result.

If government subsidies were very generous, energy producers and the forest industry might have to compete for access to forest biomass. Witnesses who appeared before the Committee strongly agreed that generous subsidies for using forest biomass as an energy source would greatly disrupt the forest system and this situation must be avoided at all costs.

c) Social Considerations

Let the markets operate; and let that material achieve its highest value in a societal sense. As we think about incentives, we have to determine what we are trying to achieve. What are the values that these incentives might try to optimize?

Tat Smith, Professor and Dean, Faculty of Forestry, University of Toronto, as an individual

i) Energy Security

On the surface, energy security does not appear to be an issue for Canada. Canada is a major net exporter of oil and natural gas and has vast natural resources to produce hydroelectric, wind and wood energy. However, energy security can be a problem at a regional level.

The concept of energy security includes at least two factors : price stability and reliable supply. In the case of oil, geopolitical events that take place thousands of kilometres away can have a significant impact on world prices. In Canada, these overseas events would not have an effect on energy security in terms of reliable supply, but it would have an effect on price stability. This means that a community or region could improve its energy security by favouring forest biomass heating, for example, over oil heating.

Yet, there is also the possibility that the price of forest biomass will change suddenly (e.g., the price of wood pellets increases); however, it will change based on the normal interaction of supply and demand, not geopolitical events.

If you ask whether we are in support of exporting pellets from Canada to foreign countries, I would say in general that we do not because we do not see this as an added value for our industry. If you ask us whether there are domestic pellet applications that could replace petroleum products, the answer is yes, but when it is used “internally,” here, to reduce the damage caused by the use of petroleum.

Robert Pinette, Vice President of Woodlands, JD Irving Ltd.

The principle of energy security can even be applied on an individual level. Consumers tend to prefer stable energy prices. However, if a household uses external energy sources for its day-to-day needs, it is exposed to sudden fluctuations in price.

While the price of fossil fuels, like oil and natural gas, fluctuate considerably, forest biomass (wood-pellet heating) and electricity also vary. One of the advantages of supplying household heat or electricity needs using solar panels, micro-turbines or geothermic units is that operating costs are low.⁷⁴ Households that use these types of energy are protected from sudden increases in energy prices, which means that their energy security is higher.

ii) Creating Jobs in the Local Economy

With rising energy costs, this once-unwanted biomass can provide increased revenue and employment opportunities for local contractors and forest communities. As such, Sierra Club Canada supports the procurement of forest biofuel on existing forest tenures.

Emma Cane, Biologist, Sierra Club

A progressive forest bio-energy policy will revitalize employment in the forest regions of our nation, and in particular, it can help appreciably reduce Eastern Canada's dependency on imported heating oil and coal.

Roger Samson, Executive Director, Resource Efficient Agricultural Production (REAP)

⁷⁴ Note that installation costs are usually very high.

Creating jobs in the local economy is an important factor when encouraging the production of certain forms of energy through public policy. This is particularly true in rural regions with very high unemployment rates. A source of energy that can be produced locally, such as wood pellets made from forest biomass, is usually beneficial to rural development. However, it is a good idea to keep in mind any unintended consequences.

If a strong public policy on developing forest biomass energy production is so successful at creating jobs that it drains other areas of the regional economy, the economic benefit of the policy would be called into question.

2. Analysis

We also have to diversify the use of the woody residue from the lumber industry into bio-energy and biochemicals.

Some governments have thought that the answer is to simply produce bio-energy from wood. We can tell you [...] that, if you simply produce bio-energy, you lose 80 per cent of the jobs. In addition to that, if you simply produce bio-energy, your economics are very shaky unless you are completely dependent upon government subsidies.

Also, if you just use the trees for energy, you find that your environmental footprint is suspect because of all the energy used in harvesting, transporting and processing. On the contrary, if you integrate bio-energy, biochemicals and biofuels into the existing industry, your trees are getting a lift to the mill on the lumber truck; your economics are much sounder because you are using what was your waste stream to produce bio-energy and biochemicals; and your employment multipliers are better than any other alternative.

Avrim Lazar, President and Chief Executive Officer, Forest Products Association of Canada

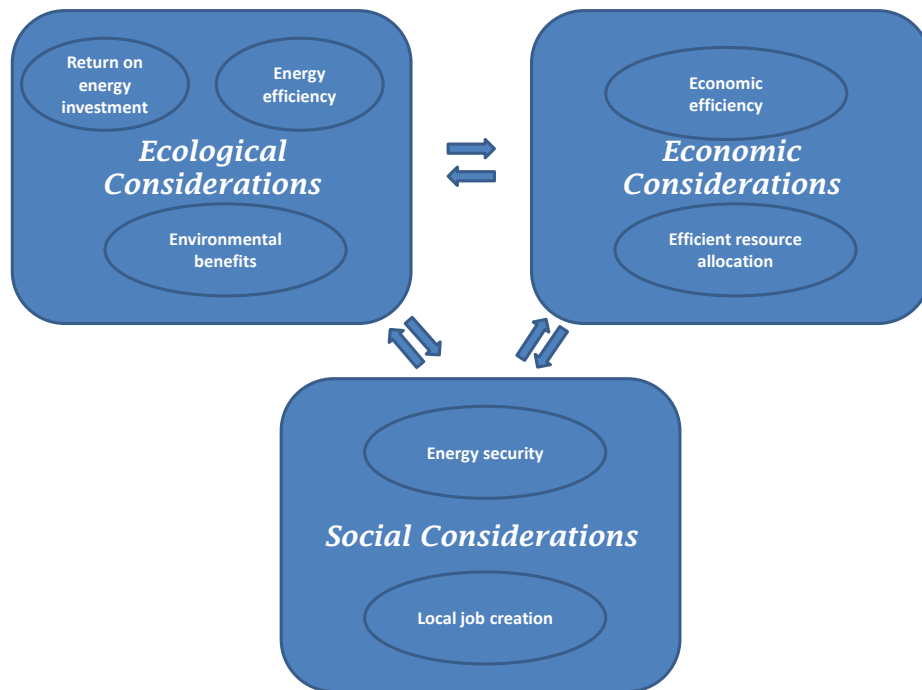
a) Summary of Criteria to Determine the Ecological, Economic and Social Desirability of an Energy Source

Figure 7 illustrates the criteria examined in the previous section. Based on the elements in this diagram, an ideal energy source is one that:

- Maximizes the energy return on investment;
- Maximizes energy efficiency;
- Minimizes the negative impact on the environment;
- Maximizes economic efficiency;
- Optimizes resource allocation within an industry;
- Ensures energy security; and
- Creates jobs in the local economy.

Note that these objectives do not necessarily go hand-in-hand. For example, a government policy that favours heating houses with wood cut with saws and axes and transported using horses may well maximize the number of jobs and minimize the negative impact on the environment, but it would be very economically inefficient. The ideal alternative energy source strikes a balance between these sometimes conflicting objectives.

Figure 7 – Criteria to determine the ecological, economic and social desirability of an energy source



b) Performance of different forms of Energy from Forest Biomass

Thermal energy is, by far, the most commercially available technology and also the most efficient with the highest energy return on energy investment for the use of that resource.

Adam Sherman, Program Director, Biomass Energy Resource Center (BERC)

The U.S. had a target of so much cellulosic ethanol by a certain date, but the technology was not there to hit that target. As a result, everyone looked foolish and wondered why the target was set when they were not able to reach it.

Jack Saddler, Dean, Faculty of Forestry, University of British Columbia, as an individual

Forest biomass can be used to produce three types of energy:

- heat energy for space heating;
- electricity; and
- biofuel.

Furthermore, there are two sources of forest biomass used to produce energy:

- sawmill residues; and
- wood harvested from cutting areas.

When we combine the possible types of energy with the possible sources derived from forest biomass, we arrive at six possible energy options. Testimony before the Committee was used to develop Table 8, which illustrates subjectively how these six options measure up to the seven criteria identified in Figure 7.

Table 8 – Performance analysis of different types of energy produced from biomass. (Dark colours indicate that the type of energy meets the criterion relatively well and light colours indicate that it does not meet the criterion very well.)

	Space heating – sawmill residue	Space heating – wood from cutting areas	Electricity – sawmill residue	Electricity – wood from cutting areas	Biofuel – sawmill residue	Biofuel – wood from cutting areas
Maximizes the EROI	Dark	Medium	Medium	Medium	Light	Light
Maximizes energy efficiency	Dark	Medium	Medium	Medium	Light	Light
Minimizes negative impact on the environment	Dark	Medium	Medium	Medium	Light	Light
Maximizes economic efficiency	Dark	Medium	Medium	Medium	Light	Light
Optimizes resource allocation in the forest sector	Medium	Light	Medium	Light	Medium	Light
Ensures energy security	Dark	Medium	Dark	Medium	Dark	Medium
Creates jobs in the local economy	Light	Light	Light	Light	Light	Light

Source: Parliamentary Research and Information Service, Library of Parliament

In keeping with the testimony heard by the Committee, the table shows that using sawmill residue to generate energy for space heating is the most efficient method overall, as it most closely meets the evaluation criteria. Producing biofuel using wood from cutting areas is the least efficient method, as illustrated by the relatively large number of light squares.

It is important to note that Table 8 is a static analysis, that is, **a snapshot of the current situation**, and does not evaluate the future performance of these types and sources of energy. For this reason, the results for producing biofuels like ethanol from forest biomass can seem very disappointing. Currently, biofuel conversion technology is not very energy efficient, it is very expensive and it is not commercially produced on a large scale. Only sustained R&D can improve these results in the future.

c) What Should Government Involvement Look Like?

I am not asking you to give us the money, but just loan it to us on a revolving fund basis, a green bond basis, or some basis on which we could have access to that capital. It would, first, improve our greenhouse gas record as a country, and second, improve our economics and therefore make employment more sustainable.

[...]

There is a tendency to go with fashion, so let us put money into solar or tidal or wind or agricultural waste. Government should not decide where the renewable energy should come from. It can create encouragements, premiums or subsidies for renewable energy, but they should be source neutral, and then let the marketplace decide who can produce it the fastest.

Avrim Lazar, President and Chief Executive Officer, Forest Products Association of Canada

I encourage the government, when thinking about grants, to experiment with new ways of spending the money that will be more effective than what is happening now.

Our council is a big believer that it is not how much money we have but how wisely we spend it. We can do much more with less. The government must have flexible policies and programs to allow these groups to experiment with better ways of spending money.

Craig Crawford, President and Chief Executive Officer, Ontario BioAuto Council

It could be inferred from Table 8 that a government policy to encourage the use of biomass to produce energy should focus on promoting the use of sawmill residue to heat buildings and CHP systems. However, there is a caveat: Table 8 provides only a general analysis, and the results may not be applicable in specific situations.

For a specific region, producing electricity using biomass harvested directly from the forest may be the best solution, if a large quantity of non-commercial grade wood is available. Williams Lake, a British Columbia community in the heart of forests decimated by the pine beetle, fits this scenario. See Sidebar 2 for the case study.

Sidebar 2: Generating Electricity from Biomass in Williams Lake

There are several examples of biomass electricity production that illustrate environmental, economic and social benefits. For example, on a community level, it can be beneficial to fuel a large-scale power plant with forest biomass. During a fact-finding mission to Williams Lake, British Columbia in September 2009, the Committee saw first-hand a good example of a forest biomass power plant that met these winning conditions. In this community, sawmills and affiliated forest companies supply biomass to fuel a 66-megawatt power plant. Approximately 2,000 tonnes of sawmill and forest residue are delivered each day from within an easily accessible radius. The power plant had also signed a long-term power purchase contract with BC Hydro with fixed terms governing the sale of electricity and access to transmission lines. From an environmental standpoint, the Williams Lake community as a whole also benefited from the deal, as the air quality in the area has vastly improved. In the past, local forestry companies used huge furnaces (called "beehive burners") to burn wood residue, which has a negative impact on the air quality in the city and expelled a high concentration of smoke and microparticles into the air. The biomass power plant solved the air-quality problem. However governments, communities, businesses and individuals must be extremely careful when making energy choices. Optimal conditions must be met if a project is to succeed on a large scale. In the case of the Williams Lake power plant, the Committee noted that the optimal conditions were present and there was a true partnership between business and the community, even though the cost of hydroelectric energy from the province was cheaper.

Therefore, the question is who is in the best position to determine the best possible energy source to be used in a given community from an economic, ecological and social perspective?

The Committee believes that this is a choice to be made by the communities, businesses and individuals themselves. ***Thus, the first desirable characteristic of a government program is that decisions on local alternative energy sources should be left to the individuals, businesses and communities concerned.***

The Committee acknowledges its preference for government policies that benefit the forest industry. However, an alternative energy program that focuses solely on forest biomass could be considered incomplete and inconsistent with the principle laid out in the previous paragraph.

In fact, a community may determine that, in its case, forest biomass is not the alternative energy source that best meets the seven criteria laid out in Table 8. A government program that encourages only the use of forest biomass would limit the choices available to communities, potentially forcing them to adopt a solution that they deem less than ideal. Furthermore, a program that aims to be comprehensive should not force individuals, businesses, communities or even industries (e.g., agriculture versus forest) to choose an alternative energy source, as the best choice is often the one that maximizes energy savings. Projects designed to increase energy efficiency and conservation must be equally eligible for government subsidy programs as alternative energy projects.

Therefore, the Committee believes that the second desirable characteristic of a government program would be universality—that is, the program should support a wide variety of projects aimed at producing alternative energy and increasing energy efficiency and conservation, without necessarily favouring one sector over another.

Lastly, the Committee believes that the government program should not be biased toward either major projects (e.g., wind farms) or smaller-scale projects (e.g., heating an individual home with forest biomass). ***A third desirable characteristic of a government program is that it should give equal weight to major projects and small-scale projects.***

The desirable characteristics of a federal alternative energy program can be summed up as follows:

- a) communities, businesses and individuals should decide which project is most appropriate for their particular situation;
- b) the scope of projects eligible should be as broad as possible and include energy efficiency and conservation projects; and
- c) projects of all sizes should be eligible.

The Committee believes that a national green energy fund, as suggested by the Forest Products Association of Canada, could meet these criteria. Through the fund, the government would guarantee loans by financial institutions for projects involving alternative energy production, and energy efficiency and conservation. For example, the guarantee would cover 80% of the loan. By not guaranteeing 100% repayment, the government can ensure that banks will be careful when awarding loans, as they will be responsible for 20% of the loss if the loan is not repaid. If the federal government guaranteed these loans, two crucial objectives would be met:

1. The credit available for alternative energy production projects and energy efficiency and conservation projects would be increased; and
2. The cost of credit for alternative energy production projects and energy efficiency and conservation projects would be decreased.

This program would help address one of the major problems associated with developing alternative energy sources and energy efficient projects: limited access to credit. Credit restrictions create a vicious circle because they limit the number of projects that start up; with a limited number of examples to refer to, banks are reluctant to invest in a relatively new and undeveloped sector. Increasing the availability of credit is a way of breaking this pattern.

Furthermore, the proposed program would have very low administrative costs, as private banks would be primarily involved in granting loans and determining the financial feasibility of the projects. Setting a maximum limit on government loan guarantees would allow for tight control of the total potential program costs.

Therefore:

Recommendation 9

The Committee recommends that Natural Resources Canada establish a national fund for innovative green energy and energy efficiency. The guiding principles of this fund would be universality, shared financial responsibility between public and private sectors and strict management of costs.

CHAPTER VII: RESEARCH, DEVELOPMENT AND INNOVATION IN THE FOREST SECTOR

By our definition, an innovation must be the first of its kind in a given country or continent, or in the world. It is important to distinguish between an invention, a technical success, and an innovation, a commercial success.

Roger Gaudreault, Director General, Research and Development, Cascades Inc.

(...) innovation is more often a business process improvement, a new organization, a new method of going to market or new information systems. Innovation is not necessarily a new invention or product; it is whatever an organization does to become more innovative and more productive.

John Thompson, Chairman, TD Bank Financial Group, Council of Canadian Academies

Since 1984, the productivity of the Canadian economy has lagged behind that of the United States and several other developed countries.⁷⁵ The Canadian forest industry has been no exception. For too long, this industry's competitive advantage was based on a weak Canadian dollar.

Moreover, because of its vast forest resources and its dependence on the U.S. market, this industry remained largely “upstream”, limited to serving its traditional customers and producing the same processed goods and using the same industrial processes as it always had.

While research and development (R&D) requires people with backgrounds in science, innovating is something that anyone can do. That is probably part of the problem: too few workers in the forest sector realize that they too can contribute to innovation. For example, they can suggest improvements in reforestation activities, industrial processes, and approaches to clients, or propose new products better suited to consumers' needs.

The Committee knows that R&D is only one aspect of innovation. The Committee views innovation as an economic process in which new ways of doing things and business ambition combine to create new opportunities. Thus, the Committee adopts

⁷⁵ Nicholson, Peter. 2009. “Innovation and Business Strategy: Why Canada Falls Short”. *International Productivity Monitor*, Number 18, Spring 2009, pp. 51-71.

a fairly broad definition of innovation, resembling the one adopted by the Council of Canadian Academies in one of its publications⁷⁶:

Innovation is new or better ways of doing valued things. An “invention” is not an innovation until it has been implemented to a meaningful extent. Innovation is not limited to products but includes improved processes and new forms of business organization. Innovation is of great economic importance because it is, directly or indirectly, the key driver of labour productivity growth (increased output per hour worked) and thus the main source of national prosperity.

1. Research and Development in Canada and other OECD Countries

In 2002, with the release of *Canada’s Innovation Strategy*,⁷⁷ the Government of Canada set the target for Canada to rank among the top five countries in the world in R&D performance.

Nearly a decade later, Canada still has not met this target. The most recent edition of the Organisation for Economic Co-operation and Development (OECD) publication on R&D⁷⁸ ranks Canada 12th in gross domestic expenditure on R&D as a percentage of gross domestic product (GDP), among all the countries for which the OECD tracks this statistic. In 2008, Canada’s R&D expenditures represented 1.99 per cent of its GDP, whereas the average for all OECD countries was 2.33 per cent (see Graph 13).

When we track Canada on the world scale, investments in post-secondary, higher education, R&D level and so on track pretty well; Canada is actually mapping pretty well to the rest of the world. It is on the business side that we do not.

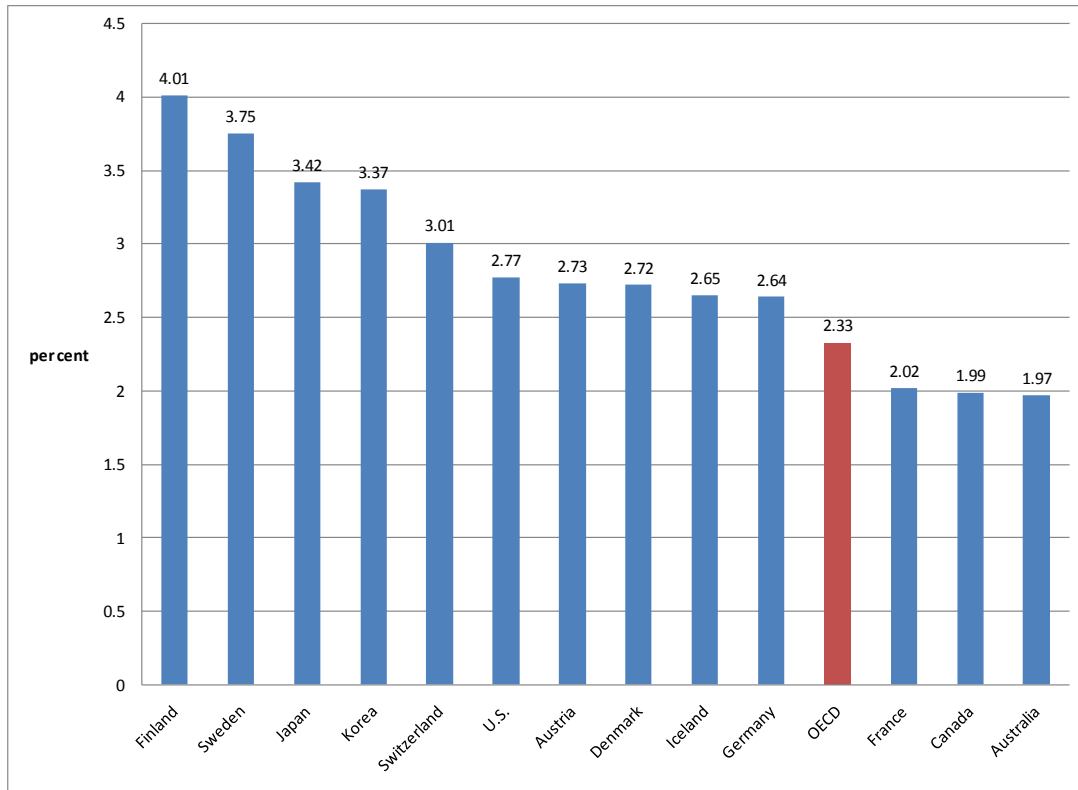
André Isabelle, Director, Environment and Natural Resources, Research Partnership, Natural Sciences and Engineering Research Council of Canada

⁷⁶[http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/inno/\(2009-04-29\)%20report%20in%20focus%20-%20innovation.pdf](http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/inno/(2009-04-29)%20report%20in%20focus%20-%20innovation.pdf), page 2.

⁷⁷ <http://dsp-psd.pwgsc.gc.ca/Collection/lu4-5-2002E.pdf>

⁷⁸ OECD. 2010. *Main Science and Technology Indicators (MSTI)*: 2010/1 edition

Graph 13 - Gross Domestic Expenditure on R&D as a percentage of GDP, 2008



Source: OECD (2010)

Canada's R&D performance falls below the average for the OECD and is half that of Finland, which made a major shift in this area following a severe economic crisis in the early 1990s. When we look at private R&D expenditure alone (that is, R&D expenditure by companies), the picture is even grimmer. **In 2007, Canadian companies' R&D expenditures as a percentage of GDP were only slightly more than half of what companies in the United States were spending. Even worse, from 2001 to 2007, Canadian companies' R&D expenditures actually decreased, and the gap compared with the average for all OECD countries grew even larger.**⁷⁹

If, as we have just seen, the Canadian economy as a whole is not a leader in terms of R&D investment, what is the situation in the Canadian forest sector?

⁷⁹ Source: *Innovation and Business Strategy: Why Canada Falls Short* (2009). The Expert Panel on Business Innovation, Council of Canadian Academies, 254 pp.

2. Research, Development, and Innovation in the Forest Sector in Canada

Funding for R&D in the forest sector can come from either public or private sources. Federal government bodies that fund R&D in the forest sector include National Research Council Canada (NRC) and the Natural Sciences and Engineering Research Council of Canada (NSERC). Natural Resources Canada also provides funds to FPInnovations, a very important research institution in Canada's forest industry.

Private sector R&D includes R&D work done intramurally by business enterprises, or at universities, or by not-for-profit organizations such as FPInnovations. In fact, FPInnovations is the largest not-for-profit research institute in the forest sector anywhere in the world, and it is at the service of the Canadian forest industry. There are also several federal programs that support innovation and R&D in the forest sector, such as:

- the NRC Industrial Research Assistance Program;
- the NRC National Bioproducts Program;
- the Value to Wood program, which is supported by the federal government but directed by FPInnovations;
- the Natural Resources Canada Transformative Technologies Program;
- the Natural Resources Canada Pulp and Paper Green Transformation Program; and
- the Natural Resources Canada Investments in Forest Industry Transformation Program.

But there is no denying that Canadian forest companies invest very little in R&D. It might seem reasonable for the industry to argue that this underinvestment can be attributed to the recent crises in the Canadian economy and the Canadian forest sector. **Yet, this underinvestment predates the current crisis and seems to have been chronic for many years.**

In 2006,⁸⁰ in current dollars, intramural R&D investment by Canadian companies in the forestry and logging subsector totalled \$20 million, and extramural R&D investment⁸¹ by these same companies totalled \$2 million. In 2008, the paper manufacturing sector's intramural R&D investments totalled \$257 million, while its extramural investments totalled \$14 million.

In the wood product manufacturing subsector, companies' intramural investments totalled \$87 million, while their extramural investments totalled \$14 million.⁸² However, these absolute figures do not convey the size of the challenge that businesses in the Canadian forest sector must meet.

⁸⁰ The latest year for which figures are available

⁸¹ External R&D investments are those made when a company pays another organization to conduct R&D on its behalf.

⁸² CANSIM table 358-0024 and <http://www.statcan.gc.ca/pub/15-001-x/15-001-x2010007-eng.pdf>

Expressed in relative terms, the statistics show that for these three subsectors of **the Canadian forest sector, total intramural expenditure on R&D as a percentage of GDP falls below the figure for the Canadian manufacturing sector as a whole.**

In 2006, in the forestry and logging subsector, forest companies' intramural investments in R&D represented only 0.38 per cent of this subsector's GDP. In 2008, in the paper manufacturing subsector, the proportion was 3.14 per cent. In 2009, R&D investment for the wood product manufacturing subsector was 1.13 per cent.

These percentages for intramural R&D investment are much lower than those for Canada's manufacturing sector as a whole. From 2005 to 2009, intramural R&D investment by Canadian manufacturing companies grew from 4.9 per cent of this sector's GDP to 6.6 per cent. Thus, the Committee finds that Canadian forest companies, and especially small and medium-sized ones, must make an additional, sustained effort to encourage R&D and innovation.

If you look at the statistics on the R&D side, the resource sector in general, not just forestry but also mining, oil and gas and so on, it is a very low percentage.

André Isabelle, Director, Environment and Natural Resources, Research Partnership, Natural Sciences and Engineering Research Council of Canada

3. R&D in the Wood Products and Pulp & Paper Industries in Canada and Certain Scandinavian Countries

The Committee heard a number of witnesses talk about the Scandinavian countries' well established reputation for innovation in the forest sector. At the meeting on October 28, 2010, the Committee discussed the role of innovation in the forest sector with representatives from Finland and Norway. In general, these Nordic countries expressed their "specific culture", particularly through wood.

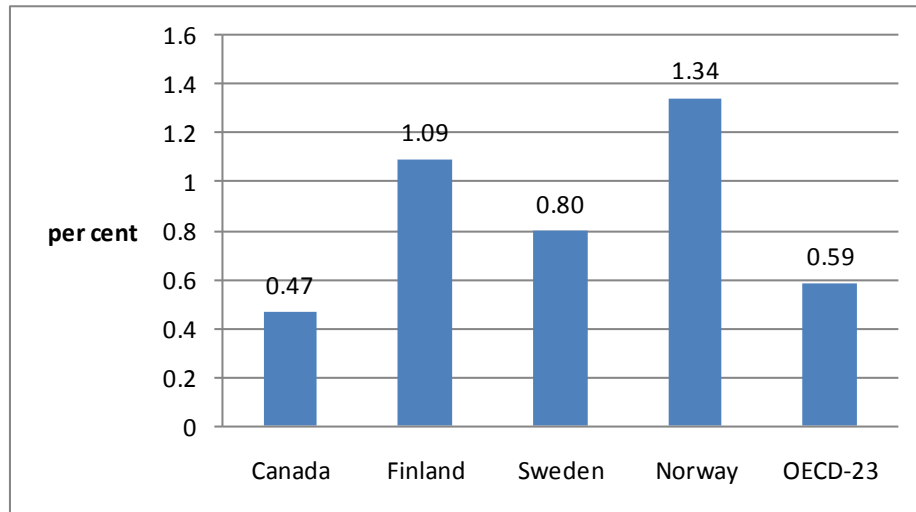
In its search for solutions, the Committee asked the OECD to provide it with international data on R&D investment as a percentage of GDP in the wood and wood products sector, and in the pulp and paper sector for 25 countries. This data was then compared with Canadian data.

In the wood and wood products sector, Canada's track record is lamentable. On average, from 2000 to 2007, Canada ranked 13th among the countries analyzed.

Its R&D expenditures averaged 0.47 per cent of this sector's GDP (see Graph 14), while those for 23 countries for which the OECD maintains statistics averaged 0.59 per cent. In contrast, R&D expenditure as a percentage of GDP in the wood and wood products sector averaged 1.34 per cent in Norway, 1.09 per cent in Finland, and 0.8 per cent in Sweden. Thus, the Committee finds that Canadian businesses

have considerable catching up to do when it comes to investment in R&D in the wood products sector.

Graph 14 - Average R&D intensity of business enterprises in the wood and wood products sector (sector R&D expenditure as a percentage of sector GDP), selected countries, 2000 to 2007 ⁸³



Source: OECD and author's calculations

In the pulp and paper sector, Canada's R&D performance is better than the average for OECD countries: Canada ranks third among the countries for which statistics are maintained, after Norway and Sweden (see Graph 15).

According to OECD data, on average, from 2000 to 2007, Canada spent 3.37 per cent of the GDP generated by this sector on R&D, while the average for 22 countries for which the OECD maintains statistics was 1.14 per cent. On the other hand, noting the imprecise nature of data collection on R&D, one witness believed that the actual Canadian figure is around 0.55 per cent.⁸⁴ Also, in the course of its hearings, the Committee learned that despite all the obstacles, a corporation such as Cascades Inc. manages to invest an average of \$40 million in R&D, which ranks this company 55th among all Canadian firms.

The Committee was also able to observe the Cascades group's commitment to innovation during a visit to its tissue paper plant in Lachute, Quebec. Cascades Inc. is the only pulp and paper company in Canada that has a centre and a team that specialize in R&D.⁸⁵ Cascades also has an innovation-management system based on performance indicators that can be measured in terms of new products brought to

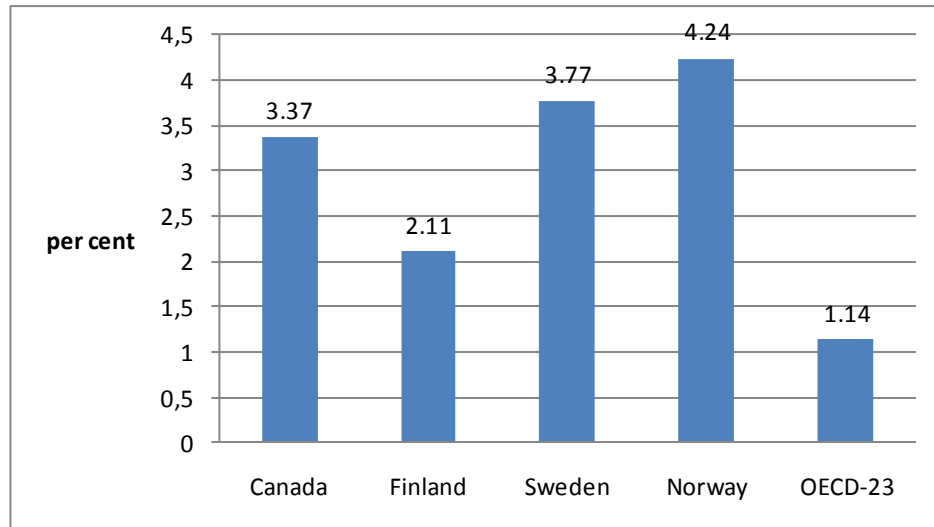
⁸³ The data for 2007 was available for only a few countries. This is R&D done by companies regardless of the source of funding (corporate, government, academic, foreign).

⁸⁴ Presentation by Prof. Patrice Mangin, Chair, Canadian Pulp and Paper Network for Innovation in Education and Research (PAPIER), October 7, 2010.

⁸⁵ Brief submitted to the Committee by Cascades on October 5, 2010

market. The Committee believes that this type of innovation-management system could serve as a model for the Canadian forest industry.

Graph 15 - Average R&D intensity of business enterprises in the pulp, paper, and paper products sector (sector R&D expenditure as a percentage of sector GDP), selected countries, 2000 to 2007



Sources: OECD, presentation by Patrice Mangin, and author's calculations

The small- and medium-sized entrepreneurs are not coming to us for funding. We are refocusing ourselves and saying that we have to rebrand ourselves to go after them.

Tom Browne, Program Manager, Sustainable Development, FPInnovations

The Committee notes that some major changes are currently taking place in the structure of the forest industry. This restructuring could have some positive effects on R&D in the sector. Indeed, the current structure was one of the factors cited most often at the Committee's meetings as a fundamental cause of the crisis. **The government would therefore be ill advised to make an all-out effort to keep this structure intact by encouraging firms to keep production facilities operating even when they are obsolete and have shown little inclination to innovate.**

4. Innovation Management Systems and Business Strategies

At the Committee's hearings, it was stated that the Canadian forest industry is often regarded as having a relatively low risk tolerance. However, in light of the recent crises in the forest sector, the industry simply no longer seems to have any choice but to make a sharp turn in the direction of

innovation. Several witnesses reported that these crises in the forest sector are pushing companies to modify their business models.

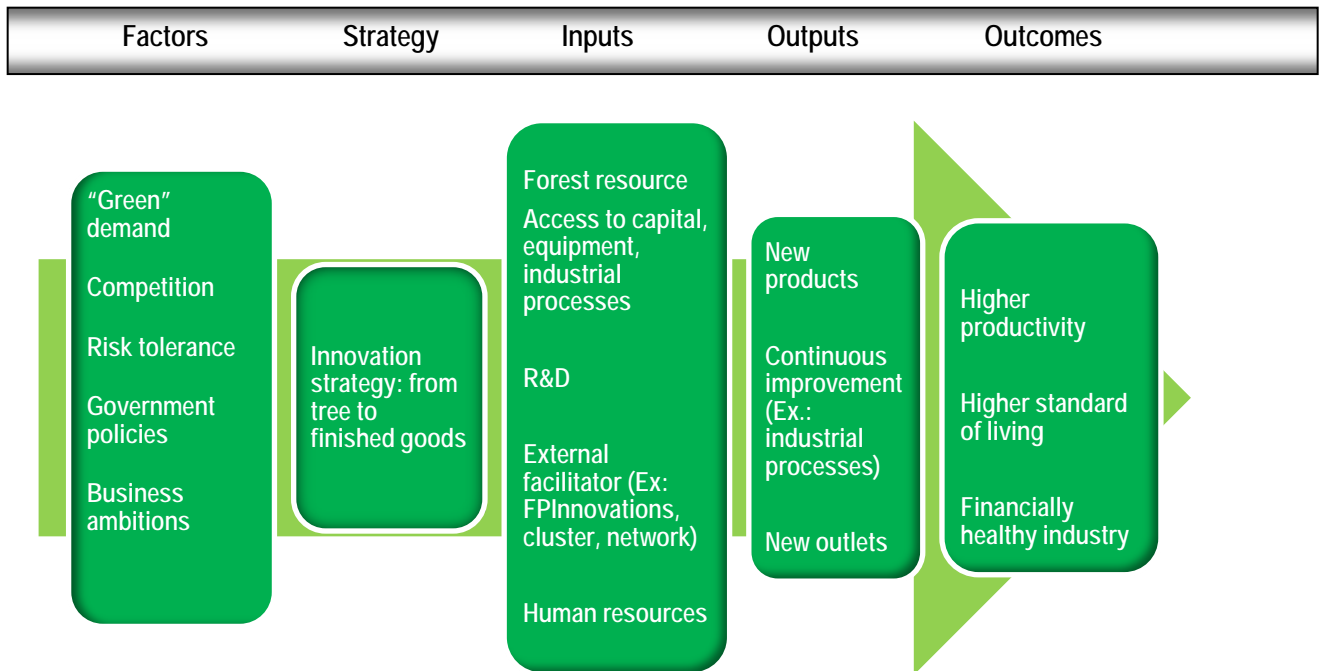
According to some experts in the field of innovation management⁸⁶, in order to have an innovation-management system that is effective and well-integrated with business strategies, six elements are essential:

- 1) knowledge (through academic learning, work, and in accordance with clients' needs);
- 2) the ability to absorb new ideas, knowledge, and practices that may come from outside the firm;
- 3) technological capacity (for example, the firm's ability to adjust to new industrial processes);
- 4) production capacity (equipment, work force skills, specifications for inputs and outputs);
- 5) technological effort (sustained small or large scale renewal efforts); and
- 6) a learning network (collaboration and networking among workers, firms, and organizations).

Thus, the industry must have the ability to incorporate these elements into its business strategy while also understanding the factors that are influencing its competitive environment (see Figure 8).

⁸⁶ Source: Ekaterina Thomas and Kirit Vaidya. 2009, "National system of innovation and technological learning: an integrated framework for understanding technological capability development in the Russian forestry sector", *Int. J. Technological Learning, Innovation and Development*, Vol. 2, No.4, pp. 294-313.

Figure 8 - Incorporating the innovation process into the business model of the forest industry⁸⁷



The demand for green products is growing all the time. The Committee believes in the Canadian forest industry’s potential in this area. Another factor to consider is the intensity of the competition. If the competition is fierce, companies are often driven to innovate more.

For too long, the Canadian forest industry has relied on basic products such as lumber and plywood and remained somewhat dependent on the United States market. This factor has probably had some adverse impact on innovation. But now the Canadian industry must keep more alert to Asian and European requirements and supply and demand if it is to compete and position itself well in these markets. The industry must therefore also increase its risk tolerance. But it is hard for a company to be more risk-tolerant, to have more business ambitions, and to display more entrepreneurship if it does not have access to venture capital and private equity, as well as public policies and a social network that enable it to support innovation.

⁸⁷ Graph adapted from:

[http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/inno/\(2009-04-29\)%20report%20in%20focus%20-%20innovation.pdf](http://www.scienceadvice.ca/uploads/eng/assessments%20and%20publications%20and%20news%20releases/inno/(2009-04-29)%20report%20in%20focus%20-%20innovation.pdf), page 10, and presentation to the Committee by Roger Gaudreault, Director General, Research and Development, Cascades Inc., Ottawa, September 28, 2010. Design: Parliamentary Information and Research Service, Library of Parliament

[...]if we are going to talk about innovation and the transformation of the Canadian industry, then we also need to transform the way in which we perceive innovation, that is, we cannot only perceive innovation as being research or investment in research, we also have to understand that we must establish an ecosystem that takes into account certain concepts including clients' needs .

Jean Hamel, Vice-President, Pulp and Paper Division, FPInnovations

[...]the industry's business model as a whole has to be completely reviewed.

Patrice Mangin, Chair, Canadian Pulp and Paper Network for Innovation in Education and Research (PAPIER)

To transform mindsets and the business model so as to embrace an innovation process linked to economic success, the Committee believes that the federal government should work more with the Canadian forest sector to instil this change in mindset.

5. Avenues for innovation in the forest industry

There are opportunities to encourage convergence of how we manage our natural resources beyond the traditional silos. This leads to integration of the different value chains. This results in a more efficient use of our limited natural resources, cross-pollination and integration of our knowledge and resources. At the end we produce products that enhance sustainability.

James Lee, Portfolio Manager, Sustainable Chemistry Alliance

There is no one unique path for the Canadian forest industry to follow to achieve innovation. The path must be multidimensional and respond to promising opportunities. There are opportunities in every part of this sector—including logging, wood products, pulp and paper, non-timber forest products, and bioenergy.

Yet, it will also be essential to break down barriers between industries. As in fields such as forest nanotechnology, for example, the forest industry will have to work with other industries, such as automobile manufacturing and aviation.

Thanks to a university-industry research partnership supported by the National Sciences and Engineering Research Council (NSERC), Canada can now use crystallites of cellulose—the most abundant organic substance on the planet—to produce nanocrystalline cellulose (NCC). NCC is a nanomaterial in the form of a biopolymer that can be used for purposes such as improving the performance of conventional exterior paints (producing paints that last five times longer) and of plastics (producing plastics that are hundreds of times stronger than conventional ones).

In July 2010, an important milestone in the commercialization of NCC was achieved. In fact, it was a world first: Domtar Inc. and FPInnovations announced a \$32.4 million initiative to build the first commercial-scale pilot facility for the production of NCC. This facility will have a daily production capacity of one metric tonne and will be located at Domtar’s plant in Quebec’s Eastern Townships.

In the area of “green” chemicals such as bioplastics, the Canadian forest industry could work in partnership with the Canadian petrochemical industry, which already has an impressive, highly advanced infrastructure. Between now and 2020, the market for plastics is expected to nearly double, to 538 million tonnes.

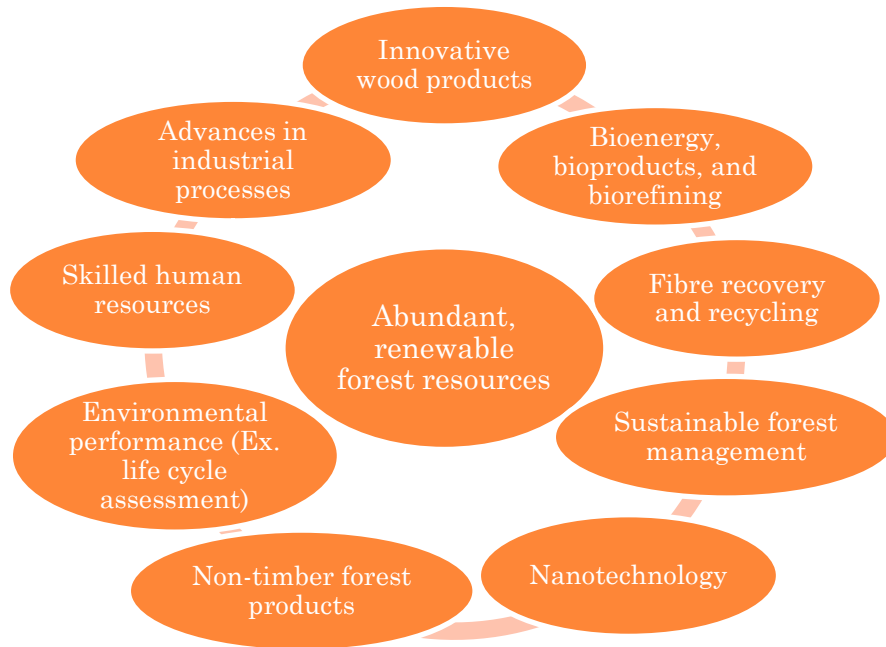
This market is already highly lucrative for the petroleum industry: only about 4 per cent of all the oil produced is converted into plastics, chemicals, and rubber, yet this market segment accounts for 42 per cent of the industry’s revenues. For the pulp and paper industry, promising opportunities include recycling fibre, reducing energy costs, and manufacturing pulp for the production of textiles.

Lastly, non-timber forest products such as edible mushrooms, tree sap, and even tree species such as ground hemlock may enable this subsector to penetrate new markets for foods, pharmaceuticals, nutraceuticals,⁸⁸ and other therapeutic products.

Figure 9 shows the main avenues of research, development, and innovation that offer promise for Canada’s forest sector. To encourage industry to follow these paths, the Committee believes that the federal government should implement policy measures and establish a competitive environment that will enable R&D to be transmitted along the innovation continuum through to its useful purpose: the commercialization of new products and services and the introduction of improved industrial processes.

⁸⁸ The term *nutraceutical* refers to an active ingredient that is present in a food in the natural state and provides a health benefit.

Figure 9 - Avenues for innovation by the Canadian forest industry



Source: Information from various presentations made to the Committee concerning innovation in the forest sector. **Design:** Parliamentary Information and Research Service, Library of Parliament

a) Support FPInnovations, a cornerstone of innovation in the forest industry

Canada has the advantage today of having a pan-Canadian national research centre, FPInnovations, whose future is nonetheless somewhat uncertain. In fact, because of the pulp and paper industry's situation, industrial funding of FPInnovations has progressively decreased to a current critical level. Governments have taken up the slack — and we thank them for that — but this is only a temporary measure.

Patrice Mangin, Chair, Canadian Pulp and Paper Network for Innovation in Education and Research (PAPIER)

FPInnovations has over 600 employees and works to optimize the value chain of the Canadian forest sector by capitalizing on wood fibre attributes to develop new products and market opportunities within a framework of environmental sustainability.

This institute is a key resource on which the Canadian forest industry can rely for R&D and innovation-related projects. FPInnovations innovates in the areas of forest genetics, harvesting operations, wood and paper products, and other fields, all along the forest sector value chain.

During its hearings, the Committee heard evidence that a large portion of the funding for FPIInnovations currently comes from government sources. However, it would appear that the institute has no guarantee of government funding in the long term. The Committee recognizes the importance of FPIInnovations for the Canadian forest sector.

b) Enhance R&D tax credits based on technology content and environmental impacts

We recommend increasing the funding [through tax credits] for existing programs, which are both appreciated and proven.

Roger Gaudreault, Director General, Research and Development, Cascades Inc.

The Canada Revenue Agency's Scientific Research and Experimental Development (SR&ED) Tax Incentive Program is the key tool that the federal government uses to encourage Canadian businesses of all sizes, in all sectors of the economy, to conduct SR&ED in Canada.

Under this program, Canadian corporations are eligible for an investment tax credit equal to 35% of the first \$3 million of expenditures for SR&ED carried out in Canada, and 20% of any additional amount. The tax credit is partially or fully refundable for small businesses. Its primary goal is to encourage more R&D in small businesses. The program therefore makes a distinction between big and small business. Canadian businesses can also take advantage of provincial R&D tax credits in addition to the tax incentive offered by the federal government.

At the Committee's hearings, a Cascades Inc. representative suggested that the R&D tax credit programs be enhanced. Cascades believes that these programs are not large enough to really stimulate innovation in the forest sector. Also, Cascades would prefer that the application for the tax credit no longer discriminate between small and large businesses, but instead discriminate according to level of technology and to whether projects promote sustainable development. The Committee believes that this proposal could help the Canadian forest sector to focus on more advanced technologies and position itself as more of a green industry.

c) Encourage investment in machinery and equipment in the forest sector

Innovation is also the investment in capital equipment.

John Thompson, Chairman, TD Bank Financial Group

Investing in machinery and equipment is the main means by which businesses keep their technology up to date. For some years now, Canada has had to cope with strong appreciation of the Canadian dollar against the U.S. dollar. Although this situation may exert downward pressures on foreign demand for Canadian forest products, Canadian businesses can also see it as an opportunity to invest in the most advanced machinery and equipment. A rise in the value of the Canadian dollar reduces the price of imports, which can make investments in advanced foreign technologies attractive.

The Committee recognizes that the federal government has introduced capital cost allowance measures that allow accelerated write-off of investments in machinery and equipment used in manufacturing and processing, as well as in production of clean energy. The Committee is also aware that the federal government has taken steps to eliminate customs duties on imports of machinery and equipment. Because Canadian businesses operating in the forest sector often rely on capital equipment from European countries, innovation in this sector has often taken the form of adapting imported technology. The example of Fortress Paper Ltd.'s conversion of the pulp and paper mill in Thurso, Quebec, which the Committee has had the opportunity to visit, clearly illustrates how important an investment in equipment can be for a city and a community.

Sidebar 3: Thurso proudly welcomes its new pulp digesters

After an 18-day voyage from Finland, the first shipment of the gigantic equipment that will be used to convert the Fortress Specialty Cellulose plant to produce rayon pulp arrived in port in Thurso yesterday.

After leaving Finland on September 25, the cargo ship had to make a slight detour to avoid Hurricane Igor and make another delivery in the United States before docking in the port of Montreal. Acquired at a cost of \$3.8 million from Stora Enso Oyi Cellulose Inc., which has gone out of business, a portion of this impressive equipment was then transferred to a barge that took it up the Ottawa River to Thurso. (...)

Source: Excerpt from Soucy, Y. (October 13, 2010). "Thurso Accueille avec fierté ses lessiveuses". Le Droit, p.5.

d) Access to venture capital and private equity

The availability of venture funds in Canada is very weak. Many of the good companies that we have will go to the U.S. to find venture funds because not only is there easier access to the money, but they also have access to organizations that know how to help them incubate their company, and they put experts on their board and they help them to be successful.

John Thompson, Chairman, TD Bank Financial Group, Council of Canadian Academies

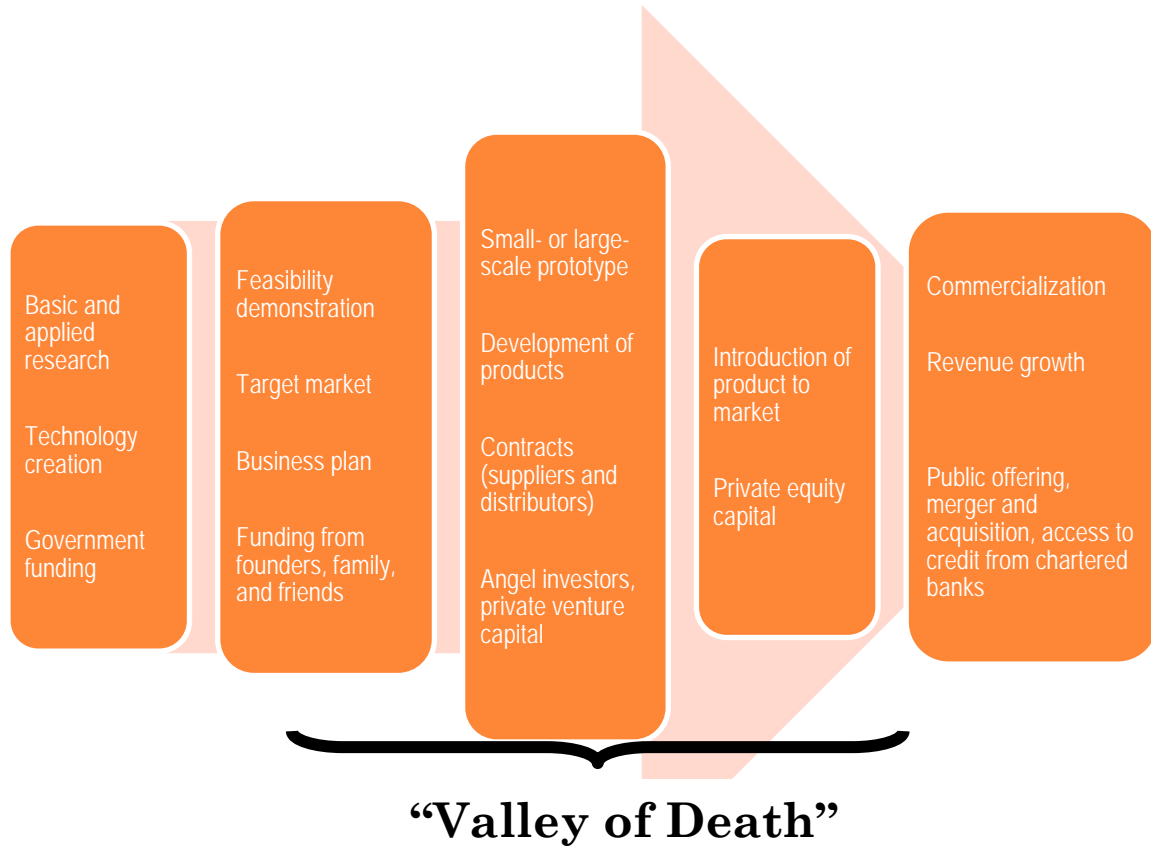
When a company is starting up, and its technology is already too advanced for it to obtain funding for experimental research such as that offered by government agencies, yet not developed enough to attract private investors wanting to acquire shares in the firm, then the company or technology is said to be in the “Valley of Death”.

This term refers chiefly to the inability to access enough venture capital or private equity to keep the company’s cash flow positive and drive the new idea or new technology all the way through the innovation continuum to the large-scale commercialization phase.

In general, governments offer a great deal of financial support for basic and applied research and for creation of new technologies. Through this support, governments significantly help to reduce the risks associated with the technical challenges involved at these stages. But once a technology has been created, the availability of government funding often tends to drop off sharply, as the public sector regards subsequent investment as being chiefly the purview of the private sector.

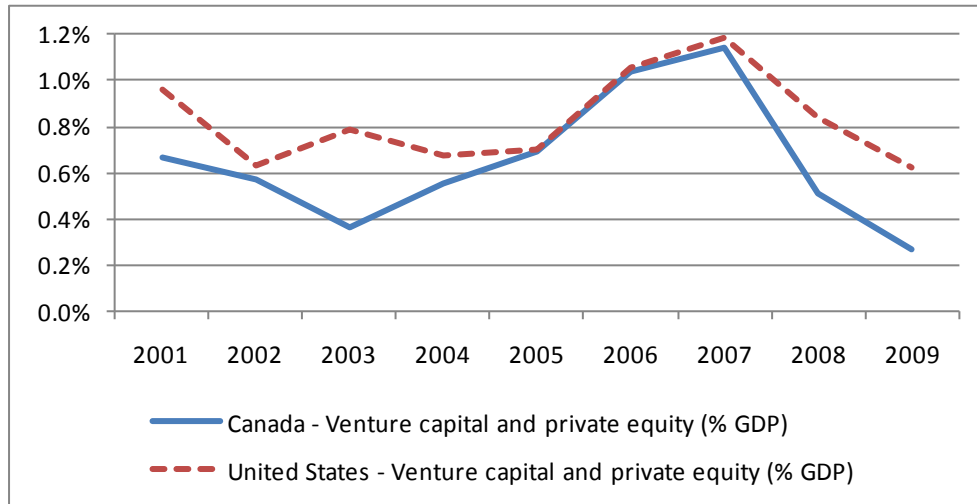
As such, government funding is withdrawn once the technology-creation phase is over, just when the company needs more capital to move on from inventing the technology to demonstrating its feasibility and building a prototype. This, in turn, creates the Valley of Death. Figure 10 shows the life cycle of a start-up company that possesses a new technology.

Figure 10. Life cycle of a start-up company with a new technology



When we compare Canada with the United States in terms of availability of venture capital and private equity as a percentage of GDP, the **figures show that access to risk capital is more limited in Canada**. According to data obtained from Canada's Venture Capital & Private Equity Association, in 2009, disbursements of venture capital and private equity in Canada represented 0.27 per cent of Canadian GDP, whereas in the United States, the figure was 0.62 per cent of GDP. **On average, over the past decade, the United States has disbursed 30 per cent more venture capital and private equity than Canada, measured in percentage of GDP (see Graph 16)**. The relative weakness of risk capital disbursements in Canada is likely to make the “Valley of Death” even more difficult for start-up companies on this side of the border.

Graph 16 - Disbursements of venture capital and private equity in Canada and the United States as a percentage of each country's GDP, 2001 to 2009



Source: Canada's Venture Capital & Private Equity Association and author's calculations

At the Committee's hearings, Biotech Foresterie, a small Canadian start-up company, described its difficulties in obtaining risk capital in the non-timber forest products industry. In addition, witness John Thompson, Chairman of TD Bank Financial Group and representing the Council of Canadian Academies, stated that Canada must become better at attracting venture capital and private equity investments and at incubating government investments across the innovation continuum through to commercialization.

I would not say we have run out of steam; we are very keen, but we will definitely need some venture capital.

Tony Roy, Project Manager, Biothec Forestry

I would like us to improve the attractiveness of early-stage investing. Some governments have helped by making funds available for the right kinds of projects. One of the things I noticed that is different in California — and you may have noticed as well — is that they do an excellent job of incubating their investments (...).

John Thompson, Chairman, TD Bank Financial Group, Council of Canadian Academies

Thus, incubating a business or a technology requires more than just disbursing venture capital and private equity at the right time. A start-up company also needs a social network where it can draw on the knowledge and experience of mentors to

complement its own social and intellectual capital. The Committee believes that the federal government should assist in creating the winning conditions for incubating start-up companies and new technologies, in terms not only of financial capital, but also of social capital (networking) and intellectual capital (knowledge).

In Canada...we are facing a shortage of mentors for younger or older business people who may not have as much experience starting new ventures.

Renata Osika, Program Director, Council of Canadian Academies

Many witnesses also stated that there should be more projects that are joint ventures between universities and the Canadian forest industry across the entire innovation continuum. Governments have an important role to play, along with private business, venture capitalists and private equity investors in assisting companies across the “Valley of Death” of the innovation continuum.

We need to emphasize that if we are to have successful innovation, we need to bring the universities in and have them work all the way through that chain. Why are we not doing so? First, there is a lack of accessible funds for business and for industry. Cost reductions in the industry are preventing them from successfully engaging in research. Some of the companies that could use innovation are without the people who have the time or the expertise to interact with the universities. There is a conservative culture that is resistant to change, which I am sure you have come across in your investigations.

John Innes, Dean, Faculty of Forestry, University of British Columbia

Government funding, or government-industry risk sharing, is an essential catalyst to accelerate the innovation process and bridge that gap between invention and innovation.

Ron Crotogino, President and CEO, ArboraNano Inc.

Similarly, several witnesses involved in bioenergy and nanotechnology projects in the forest sector also stated that there was a major need to support the incubation of promising new technologies through demonstration projects, pilot plants, and use of precommercial technologies in infrastructure.

Continued government support for pilot demonstration-scale plants to move new technologies and products from university and industrial labs into commercial reality is critical.

Tom Browne, Program Manager, Sustainable Development, FPInnovations

Finally, access to capital to build these new plants remains a challenge, given that these technologies are still pre-commercial but emerging. The only program available for advanced bio-refineries in Canada is the Sustainable Development Technology Canada, NextGen Biofuels Fund, but this fund only allows for one project per company.

Vincent Chornet, President and Chief Executive Officer, Enerkem

Canada funds research 90 per cent through tax credits, whereas the U.S. funds about 20 per cent through tax credits and 80 per cent through direct research grants. What that does is cause people to take more risk because someone else is footing the bill.

John Thompson, Chairman, TD Bank Financial Group, Council of Canadian Academies

Therefore:

Recommendation 10

The Committee recommends that the Government of Canada:

- **ensure that FPInnovations has access to long-term government funding;**
- **enhance targeted tax credits so as to encourage more innovation by Canadian businesses, in particular those in the forest sector, on the basis of technology content and environmental benefits;**
- **maintain a fiscal environment that encourages investment in and adoption of advanced technologies in the Canadian forest sector, in particular through federal policies regarding accelerated write-off of investments in capital equipment and customs duties on imports of such equipment; and**
- **through Natural Resources Canada and in collaboration with the Business Development Bank of Canada, establish an “Incubation Fund for Innovation in the Forest Sector” for the purpose of sharing risk with the industry through the “Valley of Death” in order to increase the availability of capital for start-up businesses and for innovative technologies in the forest sector.**

e) Database on life-cycle assessments for Environmental Product Declarations for wood products

On October 21, 2010, witness Wayne Trusty, President of the Athena Sustainable Materials Institute, presented the Committee with information about **the life-cycle assessments and Environmental Product Declarations (EPDs)** that some countries require for manufactured products.

Life-cycle assessments (LCAs) quantify the impacts of a product (which can be a good, a service, or a process), from the extraction of the natural resources of which it is made through to the end of its useful life. In practice, this means that the flows of materials and the energy inputs and outputs at every stage of the product's life cycle are inventoried. This information is then used to assess the environmental impacts of the product, with predetermined coefficients being applied to calculate the contribution of each flow to the various environmental impacts being assessed.

An Environmental Product Declaration (EPD) is a document that certifies the results of the LCA for a given product and makes quantitative and qualitative data about its environmental impacts available to industry, architects, engineers, suppliers, and purchasers. The EPD is a transcription of the LCA results for a product in the form of a diagram, record, or ecolabel. Thus, an EPD is used to transfer information between suppliers and customers. **The motivation to provide EPDs comes from the implementation of green procurement policies by private businesses and governments.**

Recently, several European countries (including Sweden and France) as well as countries in Asia have gradually begun to require EPDs in several manufacturing industries. Wood building materials are a particular target. For example, in 2011, France is expected to begin requiring an EPD issued by the International Organization for Standardization (ISO). In France, this EPD would be mandatory for domestic suppliers of certain manufactured products and would therefore become mandatory for foreign suppliers as well.

Canadian Manufacturers and Exporters fear that this requirement may spread throughout the European Union. Consequently, there is a real danger that the Canadian forest industry, the Canadian manufacturing industry, and Canadian exporters may be faced with the emergence of new technical barriers to imports.

Also according to Mr. Trusty, the United States is ahead of Canada with regard to EPDs. The United States has established a national database on LCAs for manufactured products. The federal government and state governments in the U.S. are increasingly requiring EPDs when awarding procurement contracts. Such databases also exist in Europe and Asia.

According to Mr. Trusty, Canada still has no such database of LCAs for manufactured products, including wood building materials. Canada is therefore lagging behind in this area. To make the Government of Canada more aware of the importance of establishing such a database, Canadian Manufacturers and Exporters,

together with the Athena Sustainable Materials Institute, has prepared a paper entitled *Environmental Product Declarations: An Emerging Non-Tariff Trade Barrier*.

In this document, Canadian Manufacturers and Exporters and the Athena Sustainable Materials Institute propose that the federal government participate in a five-year initiative to establish an EPD infrastructure, which would include:

- developing a database inventorying the life cycle of manufactured products; this database would be hosted by a department of the Government of Canada, and users would not be charged to use the data that it contains;
- a public EPD register;
- a program to educate government agencies, businesses, and associations about how to use the database;
- a secretariat to support operators and users of the database.

In committee, Mr. Trusty expressed the desire that National Research Council Canada serve as the home for this database. In addition, Canadian Manufacturers and Exporters and the Athena Sustainable Materials Institute wish to share the costs of implementing this database with governments through a public/private partnership. The estimated total cost of the project is \$14.5 million. The federal government would defray \$5 million over five years, the provinces and the private sector would contribute \$3.75 million each to the project, and the Athena Sustainable Materials Institute would make a contribution in kind of the data that it has already begun to gather. The value of these data is estimated at \$2 million.

A public-private partnership is the approach. It is certainly the approach I would advocate. I think if we are looking at \$1 million a year over a five-year program, basically what government has to do is build a good database, house it, ensure that critical reviews are done and that it is good, transparent data. That is the job of government and the database home, if you like. However, the data itself can come from industry.

(...)

First and with foresight, the Government of Quebec has already initiated this process by taking a major European data set and starting the process through an organization called CIRAIG, which is associated with one of the universities in Montreal to "Quebecize" it, if I can use that term. That may very well be a first step toward a broader Canadian database.

Wayne Trusty, President, Athena Sustainable Materials Institut.

Mr. Trusty also stated that the Government of Quebec has already begun a database initiative using European data. The Committee endorses Mr. Trusty's suggestion

that the federal government could work with the Quebec government to make this initiative a Canadian database. The federal government could thereby avoid duplication and start to build on what has already been done in Quebec.

Therefore:

Recommendation 11

The Committee recommends that the Government of Canada defray 34 per cent of the costs for a value not exceeding \$5 million in a public/private partnership to develop a database of life-cycle assessments of manufactured products, for use in Environmental Product Declarations.

CHAPTER VIII: DEALING WITH THE SOCIAL AND ECOLOGICAL IMPLICATIONS OF THE FOREST CRISIS

Chapters V, VI and VII of this report addressed the economic causes of the forestry crisis. Chapters V and VI proposed recommendations with the objective of increasing wood utilisation in the construction and energy sectors, respectively. Chapter VII, through its focus on research and development and innovation, sought to establish a connection between the structure of the industry and the current crisis.

Indirectly, these chapters have therefore addressed the economic implications (mill closures and employment loss) of the crisis in the forestry industry. Tackling the economic implications of the crisis through direct government intervention (e.g., subsidizing newsprint mills so that they can reopen and rehire laid-off workers) would not serve the forest industry well in the long run.

This kind of solution would be short-lived and would only postpone the resolution of the problem to a later date. Therefore, dealing with the economic implications of the crisis can only be done by tackling the *addressable* causes of the forestry crisis, which is the objective of Chapters V to VII.

Notwithstanding that the economic implications can only be addressed indirectly, the social and ecological implications can certainly be dealt with directly. This Chapter therefore proposes recommendations that could help alleviate the social and ecological implications of the forestry crisis.

1. Social Implications

Our region has felt the economic downturn extremely severely. We have, like I said, a regional population of 15,000 people, 23 per cent of which are First Nations. Five of our sawmills have closed within our region, which has related in 1,145 direct and over 1,700 indirect job losses. More than 2,800 workers have been displaced. When you are looking at a regional population of 15,000 people, it is a huge impact.

Clare Lauzière, General Manager, Northeast Superior Forest Community

The crises of the forest industry have had deep social implications. These impacts are not only felt by rural communities, but by Aboriginal communities as well. **Eighty percent of Canada's Aboriginal population lives in forested areas in Canada**⁸⁹ with numerous Aboriginal communities across the country depending on the forest sector for direct employment of their population, as well as ensuing regional economic benefits.

⁸⁹ See: Canadian Council of Forest Ministers, "Involving Aboriginal People in SFM" <http://www.sfmcanada.org/english/topics-aboriginal.asp>

Over the course of this study, the Committee heard numerous witnesses speak of forest-dependent communities being hardest hit by the crisis in the forest sector, with thousands of workers being laid-off, and families and whole communities feeling the effects. Although the situation has been grim, the Committee also heard testimony that gives cause for great optimism.

The crisis has had an impact on communities in two important ways: communities are finding new ways to use the forest's resource; and, people are seeing the sector in a new light, and examining the potential for a future sector that has a more intimate relationship with the communities in which it operates. Each of these implications is discussed below.

a) Finding new ways to use the forest resource

As discussed in the previous chapter on innovation, the forest crisis has forced the sector as a whole to take a step back and re-examine not just how it has operated in the past, but how it will continue to operate in the future and remain competitive in a highly global market. This demands that the sector look at innovative approaches to using forest resources that were once not considered viable, such as the use of cellulose fibres to make rayon.

The crisis has also brought about a movement in forest-dependent communities to find new ways to use the forest resource, which again would not have been in the past considered economically viable. The Committee heard that at the community level there is a resurgence of community members participating in activities that were considered as only hobbies not long ago. **Cultivating berries, making furniture, producing birch tree syrup, and making decorative greenery harvested from forests**⁹⁰ are all activities that have new meaning as an economically viable prospect that complements large-scale forestry activities.

⁹⁰ See: Non-Timber Forest Products Network of Canada, Strategic Plan.
<http://www.ntfpnetwork.ca/files-ntfp/Strategic%20Plan%20for%20NTFP%20Network.pdf>

My view, and the view of many members, is maybe we are at the tail end of a 100-year cycle, where for the past 100 years we have had a certain approach to using the forest resource. It was based on land that was empty at the time, and we went at it with a kind of volume-based, export-driven mentality....I am trying to imagine what the next 100 years will be like. That is where I see not everyone is thinking about the policies or a vision for the next 100 years – things like looking at a new world, where Canada is now full and the timber supply and economics are changing. We may be looking at a world where water, biodiversity, carbon and all these other forest values will start stacking well against the fibre value alone.

Daniel Arbour, National Chair, Canadian Model Forest Network

One example of the resurgence of community participation in forestry activities is the Canadian Model Forest Network (CMFN). **The CMFN represents 15 member organizations nationally.** Across Canada, the Network involves over 500 organizations and 200 communities, including Aboriginal and non-Aboriginal communities, industry (forestry and other land uses), government (municipal, provincial, and federal), non-government organizations, schools (elementary to university), and researchers.⁹¹

Model Forests were established as experimental sites, as these were places where new forest practices were being developed and demonstrated. They are called “model” because other communities can learn from the Model Forest experience and advance their own sustainability goals. In 2007, Model Forests in Canada voted to privatize the Network as a fully functioning, not-for-profit corporation.⁹² However, the CMFN continues to receive its core funding from Natural Resources Canada, through the Forest Communities Program.⁹³ The funds are provided to the CMFN for a period of five years, which allows the entire network to operate.⁹⁴

Building on this concept, the Committee heard testimony from stakeholders in the **Forest Communities Program (FCP)**, which is a Natural Resources Canada initiative. It is a \$25-million, 5-year program that funds 11 sites across Canada⁹⁵, with the objective of **fostering community-based partnerships to develop new forest-based economic opportunities.** Examples of initiatives that have been undertaken by participating communities include:

- The Northeast Superior Forest Community partnering with the municipality of Chapleau to create the Chapleau Biomass Project – a \$56 million investment to create a 10-megawatt power plant using biomass;

⁹¹ The Canadian Model Forest Network: <http://www.modelforest.net/about/who-we-are>

⁹² The Canadian Model Forest Network, “Our History”, <http://www.modelforest.net/our-history/our-history>.

⁹³ Daniel Arbour, National Chair, Canadian Model Forest Network, testimony, November 25, 2010

⁹⁴ Ibid

⁹⁵ See: <http://cfs.nrcan.gc.ca/subsite/forest-communities>

- The Prince Albert Model Forest providing logistical and financial support to the Sturgeon River Plains Bison Stewards – a group comprised of local stakeholders whom address bison management; and
- The Clayquot Forest Communities Program partnering with the Ahousesat First Nation to create more employment in the forest sector, and to address the housing crises in the community.⁹⁶

The Program has been very successful in terms of providing communities with access to capital and partnerships that promote and implement sustainable forest management. Communities have leveraged an impressive amount of money to eventually become self-sustaining, and have also been able to secure funding from committed partners on both short and long-term projects.

With respect to return on investment ...with the federal government investment in our program, we are capable right now of leveraging almost three quarters of our annual cash income from partner sources, not the federal government. The estimates this year will be up, with partner contributions, to \$1.1 million toward our program, versus the \$325,000 federal government investment.

Sean Dolter, General Manager, Model Forest of Newfoundland and Labrador

We have our core funding under the Forest Communities Program, to the tune of \$325,000 a year, and we bring in external project funding to the tune of around \$800,000 or \$900,000 per year.

Kathi Zimmerman, General Manager, Resources North Association

The Program's funding ends in March 2012. One of the ways in which the federal government can assist communities in continuing to build partnerships is to ensure that funding continues for the Forest Communities Program. The Program is clearly a model that has been working for numerous forest-dependent communities across the country.

⁹⁶ See: NRCAN, Forest Communities Program Newsletter, Issue #5, Summer 2010.
<http://warehouse.pfc.forestry.ca/HQ/31757.pdf>

Therefore:

Recommendation 12

The Committee recommends that the Government of Canada through Natural Resources Canada continue to fund the Forest Communities Program for an extended five-year period. The Committee further recommends that funding to the Canadian Model Forest Network be maintained at its current level.

Throughout the forestry crisis, there has been much discussion of mill curtailments and closures, and their impact on communities. However, another perhaps less-known outcome of the crisis has been the impact on outfitters and small and medium-sized tourist operators.

Thousands of Canadians make their living by providing an outdoor experience to the public, through such activities as guiding, hunting, trapping, fishing, and camping. According to the Canadian Federation of Outfitters Association, the industry employs more than 20,000 people, mainly in rural and remote areas, and has an economic impact of nearly one billion dollars annually.⁹⁷

In its deliberations, the Committee heard from numerous witnesses that Canadian forests provide unparalleled outdoor experiences for the public as well as thousands of jobs that rely upon this resource. Yet, the Committee also heard that Canada's brand as a premier wilderness and outdoor enthusiast destination is not being promoted enough globally. This was particularly emphasized by the Canadian Federation of Outfitters Association.

Outfitters are a prominent tourism industry. Canada is seen internationally as a big country well known for its open spaces and abundant wildlife. As a result, the outfitter industry, which is established in Canada's forests, in its open spaces, is on the front line in welcoming this international clientele.

Dominic Dugré, President, Canadian Federation of Outfitters Associations

⁹⁷ See: <http://www.canadianoutfitters.org/#WhatRepresent> These figures are based on CFOA members - the size and scope of the total industry is greater.

In a global context where high environmental and social standards are deemed key for any tourist destination, Canada can truly compete. Canada's stringent forest laws and regulations, combined with the largest area of third-party sustainable forest management certification on earth, and a requirement to report to the public on progress towards sustainability ⁹⁸ are all points that can be emphasized to customers at home and abroad who are looking for an outdoor destination. In examining new ways to use the forest resource, outfitting and tourism provide excellent opportunities for rural communities.

Therefore:

Recommendation 13

The Committee recommends that the Canadian Forest Service and the Canadian Council of Forest Ministers work with the Canadian Tourism Commission to promote forest-based tourism opportunities.

b) Seeking a new relationship with the forest sector

Throughout the Committee's work, it was heard numerous times that Canadians need to better understand the forest sector as it operates today. Many Canadians have a vision of the industry as being set in the past or "backwards", and very destructive. As will be discussed in the following section, "Dealing with the Ecological Implications of the Forest Crisis", these perceptions have been merited to a certain extent, yet are today largely unfounded. However, the fact remains that the sector is not an employer of choice when youth are thinking of career paths, and the public's negative perception of the sector influences that choice.

The Committee also heard that perceptions of the sector are linked to where Canadians live. There is a distinct rural-urban divide when it comes to understanding the forest sector. Generally speaking, Canadians in urban settings have an outdated, more negative image of the sector, whereas Canadians in rural and forest-dependent communities have a better understanding of the sector and its relationship to their region.

⁹⁸ See: Canadian Council of Forest Ministers, "Sustainable Forest Management in Canada" <http://www.sfmcanada.org/english/sfm.asp?tID=2>

Rural Canadians in forest-dependent economies, from young children up, appreciate the forest industry. I have found the disconnect in urban centres and areas that have no exposure to the forest economy. We are taking kids from grade school out into forest operations. For high school kids we have something called Operation Heavy Duty, where they actually get on equipment for a couple of days...I have led Rotary youth groups from across Canada that have come to Prince George and spent two days learning about the whole range of the forest sector. They go back with a very different opinion. However, we do need to do more.

Janine North, Chief Executive Officer, Northern Development Initiative

Numerous witnesses mentioned that the best way to give Canadians a solid understanding of the sector and its contribution to society is through education. Several witnesses emphasized the importance of having Canadians – particularly youth - understand that the forest is a renewable resource, and that the sector is predicated on the sustainable development of that resource.

Therefore:

Recommendation 14

The Committee recommends that the Government of Canada, through the Canadian Council of Forest Ministers, work with provinces and territories to communicate and educate the public on the importance of the forest sector, while showcasing its innovative and sustainable character.

As previously stated, Aboriginal communities across Canada have also felt the impact of the forest crisis. As with other rural Canadian communities, numerous Aboriginal communities depend upon the forest sector for employment and regional economic development. Aboriginal peoples are the fastest-growing population in Canada, and are deemed to be the most important demographic for the forest sector in the coming years.⁹⁹ As such, effective and meaningful engagement with Aboriginal peoples will be critical to the future of the sector.

The National Aboriginal Forestry Association estimates that there are approximately 80 Aboriginal professional foresters, 40 Aboriginal people with

⁹⁹ Huq, F. Skills Shortages in Canada's Forest Sector, Natural Resources Canada, 2007. http://www.goforestry.ca/images/docs/LabourMarketStudy_January22007.pdf

natural science degrees, and approximately 300 Aboriginal resource technicians across Canada.¹⁰⁰

A significant gap still exists between Aboriginal peoples and other Canadians in terms of employment and income.¹⁰¹ Forestry and logging remain an important source of income for First Nations, however, many Aboriginal people still require skills training in stand tending, harvesting, mapping, inventory and sawmill operations.¹⁰²

The demands of modern life require us to turn to other sources of revenue to meet new needs. The development of wood is a major factor in the community's economic development. It must be carried out in a manner respectful of our culture and the environment. This is a legacy from our ancestors which we intend to preserve.

Simon Awashish, Negotiator, Council of the Opitciwan Atikamekw Nation

On top of the basic skills required to work in the industry at the operational level, there is a greater need for Aboriginal peoples to fill roles as natural resource managers at the regional and community level,¹⁰³ as their participation at this level is almost absent. This is particularly critical when engaging youth and young adults into the workforce. Youth should see themselves reflected at all levels of the sector, contributing to its innovation, competitiveness and long-term sustainability.

Another way in which the government can promote meaningful Aboriginal participation in the sector is through institutional arrangements. The Committee heard several examples of successful implementation of innovative approaches in forest management. In British Columbia for example, Community Forest Agreements have been developed under BC's Forestry Act. These agreements are area-based, and grant communities exclusive rights to harvest timber in their area, as well as the ability to manage other forest resources, such as botanical forest products.¹⁰⁴ Community Forest Agreements are issued for a 25-year term and are renewable every 10 years.

¹⁰⁰ Harry Bombay, Executive Director, National Aboriginal Forestry Association, testimony, Senate Standing Committee on Agriculture and Forestry, 18 November 2010

¹⁰¹ Natural Resources Canada, First Nations Forestry Program, Annual Report 2007-2008 <http://warehouse.pfc.forestry.ca/HQ/31723.pdf>

¹⁰² Ibid

¹⁰³ Harry Bombay, Executive Director, National Aboriginal Forestry Association, testimony Senate Standing Committee on Agriculture and Forestry, 18 November 2010

¹⁰⁴ Jennifer Gunter, Executive Director, British Columbia Community Forest Association, testimony, Senate Standing Committee on Agriculture and Forestry, 25 November 2010

In broad terms, Aboriginal peoples are seeking an enhanced role in natural resource management, especially on the forested lands within their traditional territories. As well, they are seeking new approaches to economic development that promote forest sustainability, contribute to the social and cultural well-being and respond to the major environmental issues, such as climate change and interim measures, such as forest conservation.

Harry Bombay, Executive Director, National Aboriginal Forestry Association

This type of institutional arrangement can be very effective in terms of engaging Aboriginal peoples in forest management. It provides the community with the opportunity to use the forest resource according to their cultural values, as well as develop their local or regional economy to a scale that meets their needs and objectives. It also provides a real-life venue where capacity-building and training can take place.

Therefore:

Recommendation 15

The Committee recommends that the Government of Canada, through the Canadian Council of Forest Ministers, work with provinces and territories to support capacity-building initiatives and develop innovative institutional arrangements for Aboriginal Communities in areas such as education, training, and business development.

2. Ecological Implications

As mentioned in Chapter III, discussing the ecological implications of the forest crisis may appear somewhat paradoxical, since the last thing Canada should worry about in the context of low demand for wood is a shortage of forest fibre.

This is particularly true in the context of the mountain pine beetle infestation that has created a temporary surplus of wood in British Columbia. This temporary surplus of wood has resulted in a reduction in market prices for wood fibre. However, the Committee believes that relying on the low cost of wood fibre is not a long-term solution to ensure the industry's competitiveness. In fact, these low market prices, through their immediate negative effects on silvicultural activities, could not only become a drag on the competitiveness of the industry in the long term, but also affect the forest's ecological role.

a) Forest Resources Development and Certification

In New Brunswick, from 1978 to 1996 we had federal provincial agreements that allowed for support not only for the thinning and planting that was taking place and still takes place there under provincial programs, but we were allowed some flexibility to use some of the money for planning as well. We need those agreements again in the effort to renew our forests for the future.

The federal stimulus money that New Brunswick received from 2009 to 2010 has helped to maintain employment for hundreds of our people and continued support is needed. For forestry in New Brunswick, the recession is not over. We still need that support.

Andrew Clark, President, New Brunswick Federation of Woodlot Owners

In the 1970s and 1980s, federal-provincial agreements on forest management and regeneration played a very important role in funding the development of forest resources. These agreements came to an end in the mid-1990s and silvicultural initiatives were then mostly left to the discretion of provinces.

More recently, modern versions of these agreements were introduced in the context of the Community Adjustment Fund (CAF) under Canada's Economic Action Plan. The CAF was launched in May 2009, and is providing \$1 billion over two years to address the short-term economic needs of Canadian communities impacted by the global recession. In consultation with the provinces, silviculture initiatives have been funded under CAF. A wood traceability initiative has also been funded through CAF in Quebec. These funding initiatives have earned high praise both from the industry and private woodlot owners.

There is a strong economic, social and ecological case for funding silvicultural activities. From an **economic standpoint**, the forest is obviously not an on/off tap, which means it will not necessarily be there in the quality and quantity that wanted when needed. Silvicultural activities are and have always been forward-looking. Even if demand for Canadian wood products starts growing at its pre-crisis pace in several years, the time to prepare and cultivate the forest is now.

This preparation can only be beneficial for the positioning and long-term competitiveness of the industry. Letting current market forces act as a disincentive to silvicultural activities could prove to be detrimental to the industry's long-term productivity. Forest management assistance measures could be seen as way to correct an economic market failure long associated with silviculture activities; it is when silviculture is most needed for the future that current market conditions may discourage it.

From an **ecological perspective**, silvicultural activities generally improve the carbon storage capability of forest, thereby helping to reduce the effect of greenhouse gas emissions. Finally, **from a social standpoint**, silvicultural activities are

generally labour-intensive; funding for these activities therefore helps alleviate unemployment problems in rural Canada.

Through the community adjustment fund there was an injection of \$10 million in 2009 into Quebec silvicultural programs for our forest owners, and \$5 million was provided in 2010. Normally, this financial assistance is to come to an end on March 31. For the organization and for our woodlot owners, this assistance was precious. In this period where producers are selling less wood, the possibility of going to work in their forest nevertheless, to improve its quality through various silvicultural projects thanks to these programs, allowed them to generate a certain amount of income. (...) So this has been an important mechanism to help the communities get through this crisis that is ongoing at the current time.

As an organization, we would like to see this program extended for at least two years, which would give us time to assess the crisis. As we speak, producers expect that they will receive assistance to get through the current crisis.

Daniel Roy, Assistant Director, Fédération des producteurs de bois du Québec

The Committee also heard from Réseau Ligniculture Québec and the Poplar Council of Canada on the merits of intensive silviculture plantations (also known as “elite silviculture plantations”). The Committee had the chance to visit a hybrid poplar plantation in Thurso (Quebec) in December 2010.

Contrary to conventional environmental wisdom that often places tree plantations in opposition to natural forests, an increase in intensive silviculture plantations could actually prove beneficial to biodiversity to the extent that the increased yields from these plantations would allow for a greater percentage of natural forest to be protected. Intensive silviculture plantations could produce yields of 20 cubic feet of wood per hectare while conventionally managed forests produce yields of approximately two cubic feet of wood per hectare¹⁰⁵. As a result, one hectare of intensive silviculture plantations could replace 10 hectares of logging in natural forest.

Furthermore, as mentioned in Chapter II, the remoteness and inaccessibility of Canada’s forests represents a competitive disadvantage for the industry in this era of high-energy prices. Since elite silviculture plantations are generally established close to mills, they could also improve the competitiveness of the industry by reducing transportation costs, thereby lowering wood supply cost. The Committee is therefore of the view that funding for elite silviculture plantations should be a component of any federally funded silviculture initiative.

¹⁰⁵ Brigitte Bigué, Réseau ligniculture Québec, testimony, Senate Standing Committee on Agriculture and Forestry, 16 novembre 2010.

Intensive plantation silviculture and ligniculture are the scenarios that have the greatest impact on forest yield. We have to think intelligently about where to put them and that is why we propose a model for plantations placed in proximity to plants and near rural communities (think of the quality jobs it could create). By concentrating our wood production efforts on small areas of land, the forest can be used for other purposes such as preservation of biodiversity, creation of protected areas and more ecological forest management.

Brigitte Bigué, Coordinator, Quebec Intensive Silviculture Network

As mentioned, CAF has also been used to fund wood traceability initiatives, also known as chain-of-custody certification. There is a close link between chain-of-custody certification and environmental forest certification: chain-of-custody certification identifies the final product as having come from a certified forest.

Environmental forest certification is a voluntary process that companies can undergo to show that they manage and use forest resources on a given territory according to sustainable forest management principles. These principles are defined differently by each certification organisation.¹⁰⁶ Table 9 provides an overview of forest certification organizations in Canada. Canada is a world leader in environmental forest certification. There are nearly 146 million hectares of certified forests in Canada, which represents 40% of the world's certified forests.

¹⁰⁶ See <http://www.mrnf.gouv.qc.ca/forets/amenagement/amenagement-certification.jsp>
[French only]

Table 9 – Forestry Certification Standards

Logo			 [Canada's National Sustainable Forest Management Standard]
Parent organization	FSC International	American Forest & Paper Association	Canadian Standards Association
Jurisdiction	International	United States and Canada (with licensing program)	Canada
Established	1993	1994	1996
Certification standards	10 principles 56 universal criteria of sustainable forest management Regional and national indicators and verifiers	13 recognized sustainable forestry objectives 34 performance measures 103 indicators	6 Canadian Council of Forest Ministers criteria 17 CSA standards of sustainable forest management Values, objectives, indicators and targets

Source: Ministère des Ressources naturelles et de la Faune du Québec, <http://www.mrnf.gouv.qc.ca/forets/amenagement/amenagement-certification.jsp> [French only].

As its name suggests, chain-of-custody certification follows a product from the forest through the various transformation and distribution stages right to the end consumer. Ultimately, chain-of-custody certification is a communication tool: a logo lets the end user know that a product is made with wood from a certified forest. The chain-of-custody process requires a significant investment on the part of forest companies, as they must keep a separate inventory for wood products from a certified forest at every step in the process.

In Quebec, within the context of the development programs I was referring to earlier, the financial assistance measures for silvicultural work allows private forest owners to partly finance their development plans. Those programs are also used to fund development plans, which is the first step in the development of a woodlot if you are going to come to the assistance of an owner. And so, indirectly, this helps with certification as the development plan is a crucial tool at the very heart of any forest certification process. And so access to this type of financial assistance is one way of helping forest owners obtain forest certification.

Daniel Roy, Assistant Director, Fédération des producteurs de bois du Québec

Forest certification is the starting-off point for a forest owner. As it has been pointed out, the program I am in charge of deals with chain-of-custody certification. Once the forest certification is obtained, chain-of-custody certification is next on the list for those involved in the steps that follow, from wood processing to the market.

Jacques Gauvin, Director, Traceability Program for Wood Products, Quebec Wood Export Bureau

Interestingly, a price premium is not the most important incentive for the industry to undertake environmental and chain of custody certification, but rather an incentive based on market access. Some large commercial clients are now requesting their suppliers to ensure that wood comes from certified forests. These clients may also request that the wood be labelled as such, rendering necessary a chain-of-custody certification.

Since certification standards are generally more stringent than provincial regulations, there is also an ecological benefit to forest certification. It is important here not to draw the conclusion that provincial regulations are inadequate. As explained by the certifications bodies that appeared before the Committee, Canada is the most regulated country in the world with respect to forest management.

However, environmental activism by lobby groups, artists and academics, which culminated in the Clayoquot Sound protest in 1993 on Vancouver Island and in the release of the documentary “L’Erreur boréale” in Quebec in 1999, contributed to building the perception of a collusion between the logging industry and provincial governments to lower environmental standards.

This perception has morphed into a certain lasting suspicion from the population with respect to provincial regulations. According to witnesses, this situation explains to a large extent the emergence of independent environmental certification bodies such as the Forest Stewardship Council that was established in 1993. The Committee is of the view that forest certification is not a temporary phenomenon and its commercial importance will likely grow over time.

Canada is the most highly regulated country in the world when it comes to forest management. There are very stringent provincial legal requirements for forest management planning and activities. It has not been good enough to keep up with critics, academics and those who believe regulation is not strong enough.

We just have to go back to the 1980s and look at activities like Clayoquot Sound where people made it clear that the regulations were not good enough. There was the start of the building of forest certification that goes above and beyond the legal requirements.

Peter Johnson, Consultant, Sustainable Forestry Initiative

The Committee notes that forest management activities and traceability initiatives have been funded by the federal government through the CAF in the last two years. CAF is scheduled to end in March 2011. The Committee believes that a standalone funding initiative dedicated to forest management and environmental certification should be established as of 2011 to replace CAF. This program should be in the form of a joint federal-provincial initiative and be in place for at least two years.

Therefore:

Recommendation 16

The Committee recommends that Natural Resources Canada create a joint federal-provincial/territorial forest resources development fund for silviculture activities (including elite silviculture plantations). This fund should also finance environmental certification and wood products traceability initiatives.

The Committee concludes this section with a brief discussion of hardwood silviculture. As pointed out by Jean-Marie Binot, Professor of Forestry at the University of Moncton, hardwood silviculture is entirely different from softwood silviculture and has been practiced only for a short period of time in Canada.

According to the industry, there is no shortage of hardwood in Canada, but there is a shortage of “high quality” hardwood. It is the quality of a hardwood tree that determines its potential for proceeding through the first, second and third stages of transformation. There is therefore a clear need to develop knowledge in the field of hardwood silviculture. Developing this knowledge could lead to enhancing the quality of the hardwood forest inventory, thereby improving the competitiveness of Canadian hardwood saw mills in the long term.

The Committee notes that the Government of Canada, in cooperation with the Government of Quebec, announced in June 2009 a \$3.1 million grant to allow *L'institut québécois d'aménagement de la forêt feuillue (IQAFF)* located in Ripon in the Outaouais region, to become a university research institute under the umbrella of the Université du Québec en Outaouais. The Committee is of the view that this type of research centre, entirely dedicated to hardwood silviculture, would also be highly valuable in the Maritime region where northern hardwood forests are also present.

Therefore:

Recommendation 17

The Committee recommends that Natural Resources Canada, in partnership with the provinces and universities, sponsor the creation of a university research centre dedicated to hardwood silviculture in the Maritime region.

b) Private Wood Lot Owners

Until the downturn in the forest industry, private woodlots supplied up to 17% of the pulp and saw logs needed by the industry, and they generated sales of approximately \$1.5 billion¹⁰⁷. Private wood lot owners have been severely hit by the down turn. For example, in Quebec, the volume of wood shipped by private wood lot owners has collapsed by 50%. The situation is said to be even worse in western Canadian provinces¹⁰⁸.

The forest industry in Canada has often used supplies from private lot owners as a residual source of wood, which meant that supplies from private wood lot owners were used to top up supplies from Crown lands when demand for wood products was strong.

The collapse in demand for wood products therefore resulted in the industry cutting off its supplies from private wood lot owners first. Not surprisingly in this context, the decline in the volume of wood marketed has been generally more severe for private wood lot owners than for the industry as a whole. Firewood represents the last remaining good market for private producers.

The ecological services (e.g., air purification, water filtration, carbon absorption) provided by private forests, which are mostly located in the southern part of the country and closer to population centres, is only beginning to be appreciated. Best forest management practices are therefore of paramount importance to enhance this ecological role.

An aging forest left unmanaged could for example become a net carbon emitter through decomposing trees. These dead trees release large amounts of carbon dioxide as they decay, which could result in the forest becoming a carbon source rather than a carbon sink. Private wood lot producers are generally not

¹⁰⁷ Bob Austman, First Vice President, Canadian Federation of Woodlot Owners, testimony, Senate Standing Committee on Agriculture and Forestry, 2 Novembre 2010.

¹⁰⁸ Daniel Roy, directeur adjoint, Fédération des producteurs de bois du Québec, and Bob Austman, First Vice President, Canadian Federation of Woodlot Owners, testimony, Senate Standing Committee on Agriculture and Forestry, 2 Novembre 2010.

compensated for engaging in practices that have environmental benefits. There are few exceptions such as the Alternative Land Use Service pilot project in Manitoba:¹⁰⁹

In Manitoba we have the Alternative Land Use Service pilot project north of the city of Brandon. Land owners are paid \$75 per acre per year for water stewardship, for not bulldozing little woodlots to raise cattle, for leaving grass waterways that reduce erosion, for planting trees, et cetera. There is a management plan involved. No one will get rich on that amount of money, but it is an incentive for those who are thinking about bulldozing down a 10 acre woodlot to use the land for fattening steers for market. The \$75 is the tipping point to get people in on the program, and it has been very successful.

In an ideal world, private woodlot owners would be compensated through market price for practices that have environmental benefits. However, since this is not the case, communities must sometimes take it upon themselves to compensate woodlot owners directly. Given the highly community-specific nature of these projects, it is difficult to see how the federal government could get involved in this type of endeavour.

One way that the federal government could help private wood lot owners adopt best forest management practices is through tax policies. A major problem for private wood lot owners is that that revenue tends to be very sporadic while forest management costs are recurrent.

On the one hand, harvesting is typically carried out only once every several years; revenue could therefore spike in harvest years, particularly if the harvest was necessary in order to salvage the commercial value of the wood after a storm or another natural event.

On the other hand, the cost of forest management activities typically recurs every year. Private woodlot owners have been lobbying for the introduction of a Personal Silvicultural Savings and Investment Plan (PSSIP). These individual plans would allow private woodlot owners to place up to 100% of their forestry revenues in a tax-sheltered account for the purpose of making future investments in silviculture and other forms of forest management. Withdrawing these funds from the account for silvicultural investments or non-forestry purposes would automatically make them taxable.

A PSSIP would therefore allow the spreading of revenue from wood sales over a certain number of years in order to match the cost related to the structure of silvicultural activities. This would lower the average tax rate paid by woodlot owners and would constitute an important incentive to invest in forest management activities despite wide annual fluctuations in income.

The Committee believes that the establishment of a PSSIP would be highly beneficial, not only in enhancing the forest's ecological role and improving the economic well-being of private wood lot owners, but also for rural communities.

¹⁰⁹ Ibid.

Indeed, private wood lot owners represent nearly half a million families, which means that approximately two million Canadians own family woodlots. About 25% of rural Canadians have a direct association with a family woodlot in their neighbourhood in rural Canada¹¹⁰. Therefore:

Recommendation 18

The Committee recommends that Natural Resources Canada work with the Department of Finance to implement a Personal Silvicultural Savings and Investment Plan for private woodlot owners in order to enhance their best management practices.

¹¹⁰ Ibid.

CONCLUSION

The purpose of the Standing Senate Committee on Agriculture and Forestry's study is to make specific recommendations to the federal government in order to help provide solutions to the crisis currently facing the Canadian forest industry.

In the spring of 2009, the Committee began its work by studying the causes of the current forestry crisis in Canada, and determine its effects on the economic, social and ecological roles of forests. Part I of the report discusses these issues, and provides a broad historical overview of the evolution of the role and responsibilities of the federal government in the forestry sector.

From September 2009 to December 2010, the study focused on finding solutions that will help mitigate the causes and effects of the crisis in the Canadian forest sector. The Committee recognises that some of the causes could not possibly be addressed by governments. Indeed, no amount of government subsidy will bring back demand for newsprint in North America, and no government policies, as well crafted as they could be, will jumpstart the construction market in the U.S. Therefore, the Committee has concentrated on realistic solutions to address the causes of the crisis.

This includes growing the market share of wood in non residential and multi-storeys construction, increasing the use of wood residues as an energy source, and making the industry more innovation-focus.

These potential solutions are presented through 18 recommendations in Part II of the report. They fall into four broad areas and are accordingly presented in four chapters. The recommendations included in Chapter V target cultural, institutional and regulatory barriers to the increased use of wood as a building material.

The recommendation in Chapter VI concerns the use of forest residues and by-products in generating energy. Chapter VII contains recommendations that address the industry's research, development and innovation profile. Finally, the recommendations in Chapter VIII seek to help alleviate some of the social and ecological implications of the forest crisis.

Since the study was conducted in the context of the worst forest crisis on record, recommendations included in this report are closely linked to the crisis and its aftermath. However, even in a scenario where the construction market in the United States suddenly stages a comeback and the value of the Canadian dollar as well as energy prices decrease precipitously, the Committee feels strongly that the proposed recommendations should be implemented.

Several witnesses mentioned that for far too long the industry has passively relied on a weak Canadian dollar and on relatively strong demand for its products, and has muddled along amid weak research and development efforts and a poor innovation profile. These errors must not be repeated. In the Committee's view, the proposed recommendations would go a long way to help ensure the long-term sustainability of the industry and in enhancing its competitiveness *even in a context where the market for Canadian wood products improves on its own.*

APPENDIX 1: AN OVERVIEW OF TREE BREEDING AND ADVANCES GENETICS RESEARCH AT THE CANADIAN FOREST SERVICE ¹¹¹

Breeding research is not as straightforward in forestry as it is in agriculture. Crop plants have been the subject of breeding programs for a very long time. Tree breeding programs are rather more recent in comparison and tree populations remain genetically diverse. Nonetheless, much progress has been made. Although still interested in the growth and adaptation of tree species, we have been putting more emphasis on wood and fibre characteristics and properties over the last few years. Our research team has conducted a series of genetic studies of wood characteristics in white spruce, Norway spruce, and eastern white pine most often in collaboration with other research groups. We have also recently established four different genetic markers directly associated with mature wood density in white spruce using a genetic association study. By selecting and breeding trees that carry these markers in their DNA, we estimate we can achieve a 5% genetic gain in wood density. We are now working to identify other markers of gene candidates related to economically important and adaptive traits in spruces (such as, wood quality, fibre quality, and growth rate), as well as genetic markers that will aid in the general study of conifer genomes and will increase our ability to select trees at a younger age.

We are interested in the effect of tree breeding on biodiversity, notably the effect of introduced seed on locally adapted populations. Natural populations are thought to be well adapted to local site conditions. Most reforestation projects, however, introduce seeds and seedlings that have originated elsewhere. Inevitably, when this introduced material becomes mature, pollen exchange with trees in the local population results. To determine whether this hybridization results in progeny with reduced adaptation to local conditions, we are crossing trees from our own provenance trials with material collected in local forests.

One of the requirements of a tree breeding program is the development and preservation of genetic resources. We maintain a seed bank that has more than 7 000 seed lots, collected from every species used in our research, and a pollen bank that contains more than 11 kg of pollen from six conifer species. We have established over 100 genetic tests throughout southern Quebec in the last 30 years. Many of our provenance tests involve trees harvested from more northern locations; planting them in these southern sites will test to some extent the effect of a warmer climate on their growth. Such tests will thus be very useful in estimating the effect of global climate change on local forests.

¹¹¹ Source: Jean Beaulieu, Research Scientist, Canadian Wood Fibre Centre, Canadian Forest Service (<http://cfs.nrcan.gc.ca/subsite/biotechnology/breeding>)

APPENDIX 2: WITNESSES

**Witnesses who appeared during the 3rd Session of the 40th Parliament
(March 3, 2010 – March 26, 2011)**

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
American Wood Council	Robert Glowinski, President, Forestry and Wood Products	May 6, 2010
ArboraNano Inc.	Ron Crotogino, President and CEO	October 21, 2010
As individuals	Gilles Huot, Architect, GHA Architecture and Sustainable Development	March 25, 2010
	Luc Bouthillier, Professor, Department of Wood and Forest Science, Faculty of Forestry and Geomatics, Laval University	April 22, 2010
	Daowei Zhang, Professor, Forest Economics and Policy, School of Forestry and Wildlife Sciences, Auburn University, Alabama, U.S.A.	April 22, 2010
	Tat Smith, Professor and Dean, Faculty of Forestry, University of Toronto	May 27, 2010
	Jack Saddler, Dean, Faculty of Forestry, University of British Columbia	May 27, 2010
Athena Sustainable Materials Institute	Wayne Trusty, President	October 21, 2010
Biomass Energy Resource Center (BERC)	Adam Sherman, Program Director	May 13, 2010
Biothec Forestry	Tony Roy, Project Manager	October 19, 2010
	Nathalie Charbonneau, Secretary-Treasurer	

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
British Columbia Community Forest Association	Jennifer Gunter, Executive Director.	November 25, 2010
Canadian Association of Fire Chiefs	Brian Maltby, Division Chief, Fire Prevention, Brampton Fire and Emergency Services	March 18, 2010
Canadian Bioenergy Association	Christopher Rees, Director for Ontario.	May 11, 2010
Canadian Construction Association	Michael Atkinson, President	March 30, 2010
	Dwight Brown, Vice-President and District Manager of PCL Constructors Canada Inc	
	Alex Rankin, Past Chair of the CCA's Canadian Design Build Institute	
Canadian Electricity Association	Cara Clairman, Vice-president, Sustainable Development, Ontario Power Generation.	May 11, 2010
Canadian Federation of Outfitter Associations	Dominic Dugré, President	November 25, 2010
Canadian Federation of Woodlot Owners	Bob Austman, First Vice-President	November 2, 2010
Canadian Food Inspection Agency	Tony Ritchie, Executive Director, Plant Health and Biosecurity Directorate	November 2, 2010
	Greg Stubbings, Director, Plant Program Integration Division	
Canadian Institute of Steel Construction	Ed Whalen, President	March 23, 2010
	Sylvie Boulanger, Director, CISC Quebec, Director of Sustainable Development	
Canadian Model Forest Network	Daniel Arbour, National Chair	November 25, 2010

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Canadian Parks and Wilderness Society	Trevor Hesselink, Director, Forests Programs	June 3, 2010
Canadian Pulp and Paper Network for Innovation in Education and Research (PAPIER)	Patrice Mangin, Chair	October 7, 2010
Canadian Standards Association	Suzanne Kiraly, Executive Vice-President, Government Relations	June 10, 2010
Capital Power Corporation	Kelly Lail, Director, Commercial Management	June 1, 2010
Cascades	Roger Gaudreault, Director General, Research and Development	September 28, 2010
Cement Association of Canada	Michael McSweeney, President and Chief Executive Officer	March 30, 2010
	Rick McGrath, Director, Codes and Standards, Engineered Structure	
Centre for Research and Innovation in the Bio-Economy (CRIBE)	Lorne Morrow, Chief Executive Officer	October 7, 2010
Chantiers Chibougamau	Frédéric Verreault, Director of Corporate Affairs and Communications	April 15, 2010
CIBC World Markets Inc.	Don G. Roberts, Vice-Chairman and Managing Director	December 7, 2010
Communications, Energy and Paperworkers Union of Canada	Dave Coles, President	November 23, 2010
Council of Canadian Academies	John Thompson, Chairman, TD Bank Financial Group	October 19, 2010
	Renata Osika, Program Director	
Council of the Opitciwan Atikamekw Nation	Simon Awashish, Negotiator	November 18, 2010

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Eastern Ontario Model Forest	Mark Richardson, General Manager	November 30, 2010
Ecolaw	Doctor William Sammons	June 3, 2010
Enerkem	Vincent Chornet, President and Chief Executive Officer	June 1, 2010
	Marie-Hélène Labrie, Vice-President, Government Affairs and Communications	
Fédération des producteurs de bois du Québec	Daniel Roy, Assistant Director	November 2, 2010
Foreign Affairs and International Trade Canada	Don Stephenson, Assistant Deputy Minister, Trade Policy and Negotiations	April 20, 2010
	Colin Bird, Director, Softwood Lumber Division	
Forest Products Association of Canada	Avrim Lazar, President and CEO	May 4, 2010
Forest Products Sector Council	Keith Lancaster, Executive Director	November 23, 2010
Forest Stewardship Council of Canada	Maia Becker, Vice-President	November 4, 2010
Forêt modèle du Lac-Saint-Jean	Colette Robertson, President	November 30, 2010
Fortress Paper	Chadwick Wasilenkoff, Chief Executive Officer	June 10, 2010
FPInnovations	Jean Hamel, Vice-President, Pulp and Paper Division	October 7, 2010
	Tom Browne, Program Manager, Sustainable Development	

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
George Third & Son Ltd.	Rob Third, President.	April 15, 2010
Greenpeace	Nicolas Mainville, Responsible, Forest Campaign	June 3, 2010
JD Irving Ltd	Robert Pinette, Vice-President of Woodlands	June 17, 2010
	Blake Brundson, Chief Forester	
Maritime Lumber Bureau	Diana Blenkhorn, President and Chief Executive Officer	April 29, 2010
Metla — Finnish Forest Research Institute	Pasi Puttonen, Research Director (by video conference)	October 28, 2010
Model Forest of Newfoundland and Labrador	Sean Dolter, General Manager	November 30, 2010
Moncton University	Yves Gagnon, Professor, K.C. Irving Chair in Sustainable Development	November 2, 2010
National Aboriginal Forestry Association	Harry Bombay, Executive Director	November 18, 2010
National Research Council of Canada	Dr. Roman Szumski, Vice-President, Life Sciences (National Bioproducts Program)	September 28, 2010
	Patricia Montimer, Vice-Président, Technology and Industry Support (Industrial Research Assistance Program)	
Natural Resources Canada	Jim Farrell, Assistant Deputy Minister, Canadian Forest Service	April 20, 2010 October 26, 2010
	Bob Jones, Director, Industry and Trade, Policy, Economics and Industry Branch, Canadian Forest Service	April 20, 2010
	Tom Rosser, Director General, Economics and Industry Branch, Canadian Forest Service	October 26, 2010

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Natural Sciences and Engineering Research Council of Canada	André Isabelle, Director, Environment and Natural Resources, Research Partnership	October 7, 2010
New Brunswick Federation of Woodlot Owners	Andrew Clark, President	November 2, 2010
Norsk Treteknisk Institutt (Norwegian Institute of Wood Technology)	Jørn Brunsell, Managing Director (by video conference)	October 28, 2010
	Jostein Baardsen, Former Managing Director (by video conference)	
Northeast Superior Forest Community	Earl Freeborn, Treasurer	November 30, 2010
	Clare Lauzière, General Manager	
Northern Development Initiative Trust	Janine North, Chief Executive Officer	November 23, 2010
Ontario BioAuto Council	Craig Crawford, President and Chief Executive Officer	June 10, 2010
Ontario Ministry of Natural Resources	Chris Walsh, Acting Director, Forests Branch	November 16, 2010
Ordre des architectes du Québec	André Bourassa, Architect and President	April 13, 2010
Pioneer Biomass Group	Philippe Thériault, Director General	May 13, 2010
Private Forest Landowners Association (BC)	Rod Bealing, Executive Director	November 2, 2010
Quebec Forest Industry Council	Guy Chevrette, President and Chief Executive Officer and Communications Director	May 4, 2010
	Yves Lachapelle, Special Adviser, Strategic Issues	
Quebec Intensive Silviculture Network	Brigitte Bigué, Coordonnator	November 16, 2010

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Quebec Wood Export Bureau	Jacques Gauvin, Director, Traceability Program for Wood Products	November 4, 2010
Resource Efficient Agricultural Production (REAP)	Roger Samson, Executive Director	May 13, 2010
Resources North Association	Kathi Zimmerman, General Manager (by video conference)	November 30, 2010
Sierra Club	Emma Cane, Biologist	June 3, 2010
Sustainable Chemistry Alliance	James Lee, Portfolio Manager	October 19, 2010
Sustainable Forestry Initiative	Peter Johnson, Consultant	November 4, 2010
University of British Columbia	John Innes, Dean, Faculty of Forestry	October 21, 2010
Western Silvicultural Contractors' Association	John Betts, Executive Director	November 16, 2010
Wood Pellet Association of Canada	John Arsenault, Director, Vice-President, Quebec Operations, Energex Pellet Fuel Inc.	May 6, 2010

**Witnesses who appeared during the 2nd Session of the 40th Parliament
(January 26 to December 30 2009)**

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Alberta Association of Municipal Districts and Counties	Tom Burton, Director, District 4	May 12, 2009
	Gerald Rhodes, Executive Director	May 12, 2009
As individuals	Tom Beckley, PhD, University of New Brunswick, Faculty of Forestry and Environmental Management	May 26, 2009
	Don Floyd, PhD, Chair, Canadian Institute for Forest Policy and Communications, University of New Brunswick, Faculty of Forestry and Environmental Management	May 26, 2009
	Jeremy Williams, PhD, Forestry consultant, Registered Professional Forester in Ontario	May 26, 2009
Atlantic Association of Community Business Development Corporations	Basil Ryan, Chief Operating Officer	May 12, 2009
BC First Nations Forestry Council	Keith Atkinson, CEO	June 16, 2009
Canadian Bankers Association	Terry Campbell, Vice-President, Policy	June 18, 2009
	Marion G. Wrobel, Director, Market and Regulatory Developments	
Canadian Council of Furniture Manufacturers	Terry Clark, President	May 28, 2009
Canadian Federation of Woodlot Owners	Peter deMarsh, President	April 23, 2009
	Jean-Pierre Dansereau, Director General, Fédération des producteurs de bois du Québec	

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Canadian Hardwood Plywood and Veneer Association	Steve Umansky, President	May 7, 2009
	Michel Tremblay, Executive Vice-President	
	Robert Kiefer, Vice-President, Government Relations, Commonwealth Plywood Ltd	
	Christian Noël, General Manager, Columbia Forest Products	
Canadian Institute of Forestry	John Pineau, Executive Director	April 28, 2009
Canadian Kitchen Cabinet Association	Caroline Castrucci, President	May 5, 2009
	Richard Lipman, Board Member	
Canadian Wood Council	Bill Love, Chairman of the Board	April 23, 2009
Canadian Wood Truss Association	Jerry Cvach, Executive Secretary	May 5, 2009
Coast Forest Products Association	R.M. (Rick) Jeffery, President and CEO	June 16, 2009
Communications, Energy and Paperworkers Union of Canada	Guy Caron, National Representative for Special Projects	May 7, 2009
Department of Natural Resources of New Brunswick	Tom Reid, Deputy Minister	June 2, 2009

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Export Development Canada	Carl Marcotte, Vice-President, Resources Group	June 9, 2009
Fédération des producteurs de bois du Québec	Pierre-Maurice Gagnon, President	June 4, 2009
	Jean-Pierre Dansereau, Director General	
Forest Products Association of Canada	Avrim Lazar, President and CEO	April 23, 2009
Independent Lumber Remanufacturers Association	Russ Cameron, President	June 16, 2009
Justice Canada	Éric P. LeBlanc, Legal Counsel, Legal Services	June 11, 2009
La Grappe agroénergétique des Coteaux	Charles Provost, Director	May 14, 2009
National Aboriginal Forestry Association	Harry Bombay, Executive Director	April 28, 2009
Natural Resources Canada	Jim Farrell, Assistant Deputy Minister	April 21, 2009
New Brunswick Federation of Woodlot Owners	Andrew Clark, President	June 2, 2009
New Brunswick Forest Products Association	Mark Arsenault, President and CEO	June 2, 2009
Northern Ontario Community Economic Development Network	Joseph LeBlanc, Student	May 14, 2009
Ontario Forestry Association	Rob Keen, President	May 28, 2009
	Carla Grant, Executive Director	
Quebec Forestry Industry Council	Yves Lachapelle, Forestry Director, Special Advisor Strategic Issues	June 4, 2009

ORGANIZATION	NAME, TITLE	DATE OF APPEARANCE
Quebec Wood Export Bureau	Carl-Éric Guertin, Communications Director	June 4, 2009
Rural Ontario Municipal Association	Eric Rutherford, Member, President of the Ontario Good Roads Association	May 14, 2009
Solidarité rurale du Québec	Claire Bolduc, President	May 14, 2009
	Cherkaoui Ferdous, Corporate Secretary	
United Steelworkers	Robert Matters, Chair, Steelworkers Wood Council	May 7, 2009

APPENDIX 3: FACT-FINDING MISSIONS

People the Committee met while on fact-finding missions

Fact-finding mission to British Columbia – September 2010

NAME, TITLE	ORGANIZATION
Peter Arnold, Master Craftman	Pioneer Log Homes of British Columbia
Donna Barnett, Parliamentary Secretary for Pine Beetle Community Recovery	Cariboo Chilcotin
Mo Bayat, Director, Services and Development Department	City of Kelowna
Larry Bedora, Architect	Cannon Design
Malcolm Brodie, Mayor	City of Richmond
David Chevigny, Founder of Pioneer Logging	Pioneer Log Homes of British Columbia
Kerry Cook, Mayor	Williams Lake
Jim Dangerfield, Executive Vice-President	FPInnovations
Gerry De Cicco, Senior Manager	Richmond Olympic Oval
Ian de la Roche, Ph.D, Adjunct professor	University of British Columbia
Bill Downing, President	Structurlam Products Ltd
Phil Evans, Professor, BC Leadership Chair	University of British Columbia
David Flanders, Research Scientist, Forest Resources Management Department	University of British Columbia
Vincent Gonzalves, Community Relations Coordinator, Brentwood Skytrain	Translink
Phil Harris, Member of Parliament	Williams Lake
John Innes, Dean, Chair of Forest Management	University of British Columbia
Sukh Johal, Technical Advisor	WoodWorks

NAME, TITLE	ORGANIZATION
Mike Johnson, Sale Department	Pioneer Log Homes of British Columbia
Andy Kilduff, Supervisor Cad/cam	Structurlam Products Ltd
Kelly Lail, Director, Commercial Management	Capital Power Corporation.
Hosny, Lakany, Adjunct Professor, Director, International Program	University of British Columbia
Marion Larue, Principal	Cannon Design
Steve Mazur, Director, Area E	Cariboo Chilcotin
Steffan Melin, Research Director	Wood Pellet Association of Canada
John Mills, General Manager	Richmond Olympic Oval
Peter Moonen, Government Relations / Sustainability	Canadian Wood Council
Frankie Nelson, Plant Administrator	Capital Power Corporation
Martin Nielson, Principal	Busby Perkins + Will
Day Petterson, Assistant Deputy Minister	B.C. Forestry
Bryan Reid, Founder of Pioneer Logging	Pioneer Log Homes of British Columbia
Jack Saddler, Professor, Forest Products Biotechnology	University of British Columbia
Paul Sadler, General Manager	Harmac Pacific
Paul Schuster, Architect	BEDes (Architecture)
Greg Scott, Director of Major projects	Richmond Olympic Oval
Sharon Shepherd, Mayor	City of Kelowna
Stephen Sheppard, Professor, Forest Resources Management Department, Agricultural Sciences (Landscape Architecture)	University of British Columbia
Shahab Sokhansanj, Adjunct Professor Chemical and Biological Engineering	University of British Columbia

NAME, TITLE	ORGANIZATION
Denise Tembillini, Manager, Community Relations and Protocol, Olympic Business Office	City of Richmond
Phillipe Thériault, Director General	Pioneer Biomass Group
Marcel Therrien, Administration and Accounting	Pioneer Log Homes of British Columbia
Guenter Weckerle, Wood Manager	West Fraser Mills Ltd.

Fact-finding mission to Timmins, Ontario – September 2010

NAME, TITLE	ORGANIZATION
Marianne Berube, Executive Director, Ontario	Canadian Wood Council
Andy Cotnam, Project Architect, President and General Manager	ANO Architects
Guy Fleury, General Manager	Domtar-Eacom Sawmill
Steven Street, Technical Director	Ontario Wood <i>WORKS!</i>

Fact-finding mission to Chibougamau, Quebec - September 2010

NAME, TITLE	ORGANIZATION
Rénauld Cloutier, Financial Director	Chantiers Chibougamau
Lucien Filion, President	Chantiers Chibougamau
Mario Ladouceur, Project Manager	Aecon
Frédéric Verreault, Director of Corporate Affairs and Communications	Chantiers Chibougamau
Louise Wapachee, Chief	Cree Community of Oujé-Bougoumou

Fact-finding mission to Thurso and Lachute, Quebec – December 2010

NAME, TITLE	ORGANIZATION
Brigitte Bigué, Coordonnator	Quebec Intensive Silviculture
Gilles Courturier, Manager, Fiber Procurement	Fortress Specialty Cellulose
Steve Fréchette, Production Mananger	Fortress Specialty Cellulose
André Labelle, Director, Human Resources	Cascades Groupe Tissue