

THE WOOD CHARTER: TAKING STOCK

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A WORD FROM THE MINISTER

DOING MORE, DOING BETTER: USING WOOD FOR CONSTRUCTION AS A MEANS OF FIGHTING CLIMATE CHANGE

I am proud to present the Wood Charter status report, which takes stock of the results obtained since Québec undertook to develop the use of wood in the non-residential and multi-family construction industry. Significant progress has been made, and the relevance of using wood as a structural and appearance material needs no further proof. The market share of wood has increased, benefiting the wood products industry, its workers and the communities in general. The positive results obtained from the Wood Charter include a better knowledge of wood as a material, significant progress with research and development, and a growing number of non-residential (commercial, industrial and institutional) and multi-family buildings constructed from wood, in both the public and private sectors.

It is important to remember that the use of wood in construction is also a powerful weapon in the fight against climate change. Not only does wood sequester carbon throughout its life cycle, but it is also an effective substitute for other materials whose production generates large quantities of greenhouse gas emissions.

Having said this, the Québec Government hopes to go even further and do even more, in collaboration with the forest sector, to fight climate change and promote the wood products industry. A pivotal goal of this process is to increase the presence of wood products from Québec on international markets. Our companies will be encouraged to innovate and develop competitive advantages that will earn them a position on the global wood construction scene.

Our Government's vision for the industry also includes a better knowledge of wood as a material, the development of techniques to use innovative products, and optimization of wood construction practices. Québec, as a leader in wood construction, must continue to develop its products and deploy its expertise in order to achieve success both nationally and internationally.

Québec is proud to innovate by using natural, local, renewable resources. Wood construction constitutes an effective response to many local and global challenges and contributes to the economic development of Québec and its regions. In the coming year, our Government is therefore determined to launch a new and even more ambitious version of the Wood Charter, which will allow us to promote our forest industry and enhance its contribution to the fight against climate change. Doing more and doing better with wood: this is our commitment!

A handwritten signature in blue ink, appearing to read 'Pierre Dufour'.

Pierre Dufour,
Québec's Minister of Forests, Wildlife and Parks



Montmorency forest bridge
Photo: MFFP



THE WOOD CHARTER

TARGET SECTOR

NON-RESIDENTIAL, COMMERCIAL, INDUSTRIAL, INSTITUTIONAL AND MULTI-FAMILY
CONSTRUCTION AND ROAD INFRASTRUCTURES

Main aims:

- » Increase the use of wood for construction in Québec and abroad.
- » Create and consolidate employment in the regions.
- » Reduce greenhouse gas emissions.
- » Create high value-added wood products.
- » Enrich Québec as a whole.

"In the coming year, our Government is therefore determined to launch a new and even more ambitious version of the Wood Charter, which will allow us to promote our forest industry and enhance its contribution to the fight against climate change."

Pierre Dufour
Ministre des Forêts,
de la Faune et des Parcs



*Multi-dwelling construction with a lightweight prefabricated frame
Photo: Cecobois*

WHY USE WOOD FOR CONSTRUCTION?

WOOD: A SOURCE OF ECONOMIC DEVELOPMENT, A LOCAL, RENEWABLE RESOURCE

Wood is a ubiquitous part of Québec's culture and identity. It is a source of pride, wealth, stimulating employment and development in every region of Québec.

Nearly 90% of the forests in Québec that produce the lumber used in wood construction systems have been certified by an internationally recognized forest certification organization. Certification is an independent, impartial evaluation process that confirms the use of sustainable forest management practices.

The choice of wood as a building material is also a choice to use a local, sustainable, renewable resource that is known to perform well, from an environmental standpoint, throughout its life cycle. The use of wood plays a role in the social, economic and environmental development of Québec.

WOOD: A TOOL IN THE FIGHT AGAINST CLIMATE CHANGE

The construction sector is responsible for nearly 40% of the world's greenhouse gas emissions. Most of these emissions are generated when buildings are in use, from the energy needed to control ambient temperatures, and can be reduced through the application of proper insulation technologies. Wood, which provides a fairly high level of thermal insulation, can play a role in optimizing the energy performance of buildings.

One-third of all construction sector emissions are due to the choice and transportation of building materials and how those materials are processed when they are no longer needed. Energy efficiency improvements and the use of renewable energies in buildings means that materials now account for a larger portion of a building's environmental footprint.

Wood, however, comes from our forests. It is created from solar energy, and only a small quantity of additional, mainly renewable energy is required to convert it into useful products. When wood is used in construction instead of other materials that are produced using large quantities of fossil fuel, the emissions from the production process can be avoided.

In addition, trees are able to capture CO₂ – a greenhouse gas that is partly responsible for climate change – and store the carbon from it. The forests therefore become vast sinks for atmospheric carbon, which is stored in the wood. This carbon, captured in the forest, remains in the products made from that wood, throughout their lifespan. In fact, the amount of carbon contained in many wood products is greater than the amount emitted into the atmosphere when they are produced. Recycling and reuse of the wood extends the carbon storage period.



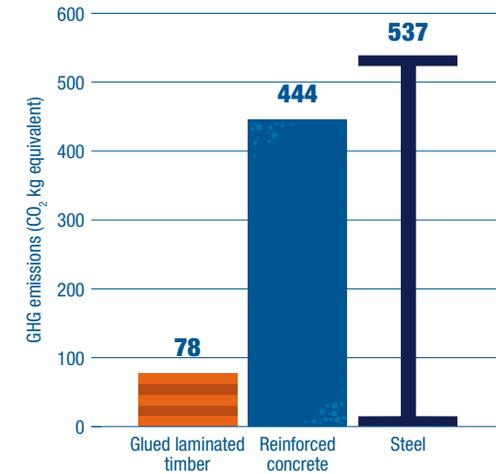
2016 figures for wood-framed multi-family buildings.

WOOD: A BIOPHILIC MATERIAL

The use of natural materials like wood creates an environment that fosters well-being and health. Research has shown that the presence of natural wood in a room helps to reduce the occupants' stress levels, and has a positive impact on human health in general. In addition, the presence of wood in schools and workplaces creates an ambiance conducive to learning and concentration.

WOOD: A HIGH-PERFORMANCE MATERIAL

On a weight-for-weight basis, wood is the most resistant of all structural materials. In spite of human expertise and technology, it has not yet been possible to design a material that performs as well, technically speaking, as wood, which is flexible, lightweight and resistant. In addition, contrary to popular belief, the low thermal conductivity of wood allows it to maintain its load-bearing capacity for longer than other materials in fires: heat spreads more slowly through wood, with the result that it burns less quickly, allowing more time to evacuate the building.



CO₂ emissions during production of a 7.3 metre beam with a load-bearing capacity of 14.4 kN/m.



Maicasagi bridge
Photo: Nordic Structures

THE WOOD CHARTER MEASURES

1. GOVERNMENT LEADERSHIP

The Government, as a major order-giver, must lead by example in the use of wood in non-residential and multi-family construction and in road infrastructures. In other words, for every project financed in whole or in part by public funds, the Government department or agency in charge must consider the possibility of using wood before the project begins, and must carry out a comparative analysis of greenhouse gas emissions using the Gestimat tool.

Gestimat, designed by Québec's *Centre d'expertise sur la construction commerciale en bois* (Cecobois), is used to quantify, analyze and compare greenhouse gas emissions from a building's structural materials. Available to the general public through a user-friendly Web interface, Gestimat applies the tried-and-tested life cycle analysis method. Along with the principle of the right material in the right place, the reduced greenhouse gas emissions achieved through the use of wood have become an essential criterion in the selection of construction and renovation materials.

An inter-ministerial committee on Government leadership in wood construction, composed of representatives from the main Government departments and agencies involved in managing projects and awarding subsidies, as well as other construction sector organizations, is responsible for implementing the Wood Charter in the public and para-public sectors. The committee members must ensure that their respective departments and agencies implement the requirements for Government leadership in wood construction.

Municipal leadership

A number of municipal entities have signed declarations proposed by Québec's federation of municipalities, undertaking to use more wood in municipal construction projects. To follow up on these undertakings, the *Ministère des Forêts, de la Faune et des Parcs* has posted a register on its website, which towns, municipalities and other municipal entities can use to register their support for the Wood Charter.

Some results

- » An initial accountability report published by the inter-ministerial committee on Government leadership in wood construction.
- » Online availability of Gestimat tool and training sessions offered to professionals in the public and private sectors.
- » Publication of several technical guides, including the Québec Catalogue of Wood Building Costs and the Guide to Municipal Buildings for municipalities.

HIGHLIGHTS

- » According to the reports on Government leadership in wood construction, completed in 2017 and 2018, consideration of the use of wood before a project begins has increased by 40%. For the two years in question, wood was selected as a structural or appearance material in almost all the projects considered.
- » 2016-2017: Out of 102 projects considered, all included wood as a structural material and 97 included wood as an appearance material.
- » 2017-2018: Out of 143 projects considered, 137 included wood as a structural material and 91 included wood as an appearance material.



Lévis river terminal (2014-2015), created by Government leadership
Photo: Cecobois

2. INNOVATIVE WOOD BUILDINGS

Proper use of wood in construction generates a number of ecological, aesthetic, economic and health-related benefits. Construction of mid-rise wood buildings (five or six storeys) and tall buildings (seven storeys or more) can help limit the problem of urban sprawl currently faced by most municipalities.

The Government therefore wishes to encourage innovative, developmental wood construction and road infrastructure projects, and to show that, with the innovative new wood products and building systems now available, it is possible to push back the technical boundaries and

use wood to construct buildings of 12 storeys or more, as well as buildings requiring equivalent measures. An advisory committee co-chaired by the *Régie du bâtiment du Québec* (RBQ) and the *Ministère des Forêts, de la Faune et des Parcs* (MFFP) has therefore been set up to oversee changes to the regulations governing the design, construction and safety of wood buildings.

A further aim of this measure is to promote the use of wood in combination with other materials in construction systems, and to develop the use of appearance wood.

Some results

- » Several projects supported by the Technology Showcase Program for innovative wood buildings and solutions.
- » Meetings held with the Advisory Committee co-chaired by the *Régie du bâtiment du Québec* and the *Ministère des Forêts, de la Faune et des Parcs*.
- » Preparation of a guide to the construction of large wooden schools and schools of more than two storeys.

HIGHLIGHTS

- » The MFFP has subsidized 13 projects for a total of \$7.25 million via the Technology Showcase Program for innovative wood buildings and solutions. The overall Program budget is \$14.5 million.
- » The RBQ has published directives and an explanatory guide for large-scale buildings not exceeding 12 storeys.



*Maison symphonique de Montréal (Montreal Symphony Hall)
Photo: Tom Arban*

3. TRAINING AND PROMOTION

Wood construction training for the sector's professionals must be improved, either by adapting the training offered by educational institutions or by providing professional development for employed workers. Vocational and technical training offered in schools must be enhanced to include wood use practices in the construction of non-residential and multi-family buildings and in road infrastructures. The Government therefore hopes to work with the universities and colleges to introduce mandatory training on wood as a construction material for new construction sector employees.

The Government also hopes to improve professional development training on wood as a material and its use in construction. Everyone involved in construction projects, professionals and tradespeople alike, will have to upgrade their knowledge. Working professionals need new skills to cope with the emergence of new engineered wood products and changes to regulations and standards. To complete their training, they will also be given proper technical tools to facilitate their work and encourage the use of wood in construction.

With regard to promotion, the MFFP will include a measure in the next version of the Wood Charter to help wood product companies to prepare environmental product declaration. This will help facilitate access to foreign markets and maintain the competitive advantage of wood over other materials.

Some results

- » Training on wood construction included in the civil engineering programs at UQAC and Laval University.
- » A short online postgraduate program on the use of wood as a material offered by UQAC.
- » Réseau Espace-Bois, a community of practice on wood as a material, set up at UQAC to provide professional development training for workers.
- » An online course on the use of wood as a material in non-residential and multi-family construction now available free of charge to the general public.
- » The PicBois web platform (Immigration Construction Platform) designed and activated by CITIM to recruit foreign workers.
- » Training activities offered by Cecobois.
- » The Cecobois Network, composed of wood construction sector professionals, set up to develop a consistent method of fostering the use of wood as a material, in order to guide the actions of Cecobois.

HIGHLIGHTS

Cecobois is tasked with supporting and facilitating the use of wood in multi-family and non-residential construction in Québec by offering technical support services and professional training for construction sector professionals, and by providing wood design expertise.

Below is a summary of Cecobois' achievements from 2007 to 2019:

- » Nearly 6,000 professionals have taken part in its training sessions, seminars and conferences.
- » More than 6,500 students have been reached through its activities in Québec's universities.
- » 76 awards have been presented at six Awards of Excellence galas, to winners selected from a total of 235 candidates.
- » 31 issues of *Construire en bois* journal have been published. In addition, 12 technical guides, 13 technical sheets and 38 case studies have been published and offered online free of charge via the organization's website.

Funding of more than \$4.8 million has been paid to the universities since the Government's commitment to the Wood Charter (2013-2019):

- » Laval University: \$2 million
- » Université du Québec à Chicoutimi (UQAC): \$2.8 million, some of which came from the Green Fund



Hockey stadium and service building, Université du Québec à Chicoutimi
Photo: Cecobois

4. RESEARCH AND INNOVATION

To support a competitive business sector and an innovative and dynamic wood construction sector, it is important to foster the development of local research expertise and encourage technology transfers. Research and development are needed in particular to support the design of mid-rise (five or six storeys) and tall (seven storeys or more) non-residential and multi-family buildings, since a global approach to building systems is required to obtain good structural, thermal, acoustic, mechanical, fire safety and other performance features in a building.

To promote an innovative approach to the use of wood in construction, the Québec Government intends to support research and development activities in the field of eco-responsible wood construction, with the aim of improving the competitive capacity of wood sector firms.

The purpose of this measure is to permit the development of knowledge and expertise that will encourage the emergence of new buildings and ensure that the use of appearance and structural wood in combination with other materials is also considered.

Some results

- » Collaborative research on the development of advanced construction systems carried out by FPInnovations, for the benefit of Québec's wood construction industry.
- » Research projects carried out by FPInnovations to acquire new knowledge of low carbon footprint materials.
- » Creation of an industrial research chair on eco-responsible wood construction (CIRCERB), along with research projects, higher education projects, international training placements, workplace training placements and publication of scientific papers.
- » Assistance paid under the Wood Innovation Program to numerous wood construction industry companies.

HIGHLIGHTS

The CIRCERB is an integrated, multidisciplinary university platform combined with an industrial consortium that works on all aspects of the construction sector value creation network to develop eco-responsible solutions using wood as a means of reducing the ecological footprint of buildings.

Below is a summary of its achievements from 2013 to 2018:

- » 65 research projects completed: 5 at post-doctoral level, 28 at doctoral level, 32 at masters level
- » 14 international trainee placements
- » 30 business and research trainee placements
- » 40 scientific publications
- » 2 patent applications

FPInnovations is specialized in the creation of scientific solutions to support the competitive capacity of Canada's forest sector on the world stage and meet the most pressing needs of its industrial members and government partners.

The MFFP provides financial support for FPInnovations, in particular for its studies of wood construction in Québec. The completed studies include an analysis of the Arbora building's life cycle, which found that wood structures can help avoid up to 20% of the greenhouse gas emissions produced by traditional structural materials.



*Forêts, Faune
et Parcs*

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