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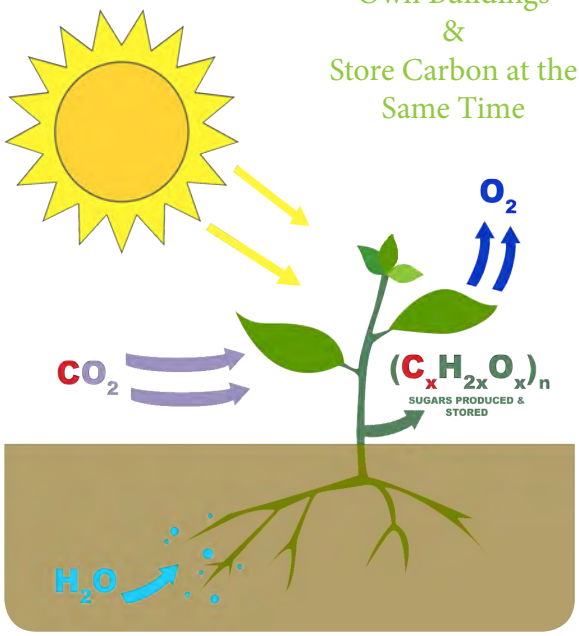
WoodEqual Kit

Environmental Benefits

We Can Grow Our Own Buildings & Store Carbon at the Same Time



Did You Know?
Carbon accounts for around 50% dry weight of a tree

To Address the Increasing Emission of CO_2 We Must:

- **Reduce Carbon Emission**
- **Remove Carbon From the Atmosphere**

Building With Wood Satisfies These Two Challenges

Reduce Carbon Emission: Through the natural process of photosynthesis, trees use energy from the sun to convert CO_2 from the atmosphere and water from the soil and air to create sugars – think maple syrup! - the building blocks of cellulose and wood and the food source that allows trees to grow. At the same time, life-giving oxygen is released from the leaves and needles. No man-made resources are required for the generation of wood, trees and forests.

Remove Carbon From the Atmosphere: The main ingredient of these complex sugars is carbon - extracted from the absorption of CO_2. Therefore, wood is an important sequestering agent or carbon sink, which locks up atmospheric carbon in structures. In this way, wood products can help to offset carbon dioxide emissions and other greenhouse gases that would otherwise contribute to climate change.

The Global Environmental IMPACT of Buildings

20%
OF WATER CONSUMPTION

25 - 40%
OF ENERGY USE

30 - 40%
OF GREENHOUSE GAS EMISSIONS

25 - 40%
OF SOLID WASTE GENERATION

"The built environment is an enormous contributor to the factors damaging the very environment designers are trying to improve" - Michael Green

The construction and operation of buildings is the most significant consumer of natural resources on the planet. However, the manufacture of materials other than wood is primarily based on the exploitation of non-renewable natural resources, including fossil fuels. As the demand for buildings grow, many key non-renewable natural resources could become non-existent if we do not change how we design and build our buildings. We cannot continue to consume that which can't be replaced. The use of wood in construction can minimize these impacts, but only if we understand how it can be used to meet our needs. The global challenge we all face can be met, in part, by using more renewable materials, including wood.

Sources:
[1] Vilijakainen, Mikko. "The environmental impact of construction and the manufacture of building products." Will the new energy-efficiency requirements be sufficient?. (2009): http://www.forestindustries.fi/Infokortit/greenconstruction/Documents/Theenvironmentalimpactofconstruction ENG.pdf

ENVIRONMENTAL PRODUCT DECLARATION

NORTH AMERICAN SOFTWOOD LUMBER

AMERICAN WOOD COUNCIL
CANADIAN WOOD COUNCIL

Environmental Product Declarations

The North American forest Industry is the **First** Building material industry to produce a 3rd party certified Environmental Product Declaration (EPD) to summarize the environmental performance of their products throughout the entire industry.

This EPD is based on a cradle to gate product system; including forest management, logging, transportation of logs to lumber mills, sawing, drying and planing.

The delivery of the product to the customer, it's use and eventual end-of life processing are excluded from the cradle to gate portion of the life cycle. Therefore, **Carbon Sequestration** is not accounted for in the EPD because the benefit of sequestration is not realized at the point of manufacturing but occurs over the life cycle of the product.

A **Lifecycle Assessment (LCA)** is a tool to measure the environmental impacts associated with each stage of the products lifecycle.

An **Environmental Product Declarations (EPD)** is a fact based document that best communicates the LCA information in three life cycle impact categories of Atmosphere, Water and Earth (shown below).

To download the complete EPD and transparency brief visit: www.cwc.ca/index.php/en/design-with-wood/sustainability/life-cycle

LIFECYCLE IMPACT CATEGORIES

The environmental impacts listed below were assessed throughout the product's lifecycle – including raw material extraction, transportation, manufacturing, packaging, use, and disposal at end of life.

	ATMOSPHERE			WATER		EARTH	
	Global Warming Potential refers to long-term changes in global weather patterns – including temperature and precipitation – that are caused by increased concentrations of greenhouse gases in the atmosphere.	**Ozone Depletion Potential** is the destruction of the stratospheric ozone layer, which shields the earth from ultraviolet radiation that's harmful to life, caused by human-made air pollution.	**Photochemical Ozone Creation Potential** happens when sunlight reacts with hydrocarbons, nitrogen oxides, and volatile organic compounds, to produce a type of air pollution known as smog.	**Acidification Potential** is the result of human-made emissions and refers to the decrease in pH and increase in acidity of oceans, lakes, rivers, and streams – a phenomenon that pollutes groundwater and harms aquatic life.	**Eutrophication Potential** occurs when excessive nutrients cause increased algae growth in lakes, blocking the underwater penetration of sunlight needed to produce oxygen and resulting in the loss of aquatic life.	**Depletion of Abiotic Resources (Elements)** refers to the reduction of available non-renewable resources, such as metals and gases, that are found on the periodic table of elements, due to human activity.	**Depletion of Abiotic Resources (Fossil Fuels)** refers to the decreasing availability of non-renewable carbon-based compounds, such as oil and coal, due to human activity.
TRACI	**72.64** kg CO2 eq.	**0** kg CFC-11 eq.	**14.51** kg O3 eq.	**42.25** H+ moles eq.	**0.0326** kg N eq.	**0.11** kg	**1113.01** MJ
CML							

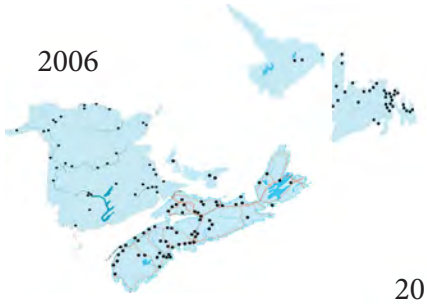
FUNCTIONAL UNIT The declared unit is 1 cubic meter of planed, kiln-dried softwood lumber, which is equal to 630 board feet (0.63 mbfm). The average density of North American softwood lumber is 433.57 oven dry kg/m3. Results are expressed for a cradle-to-gate analysis and exclude use phase and end of life impacts.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION

This EPD was developed in compliance with ISO 14025 and ISO 21930 and has been verified under UL Environments EPD program.

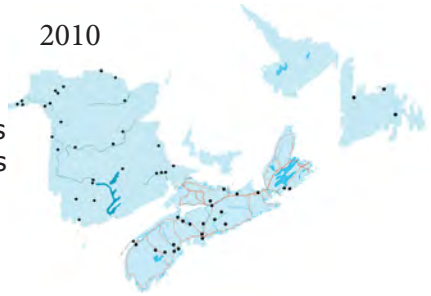
Economic Benefits

Effects of U.S Market Collapse on Atlantic Sawmilling Region



MLB Sawmill Members

Province	2006	2010	(+/-)
NB	38	29	-9
NS	63	29	-34
NL	36	1	-35
PEI	3	1	-2



Total Change

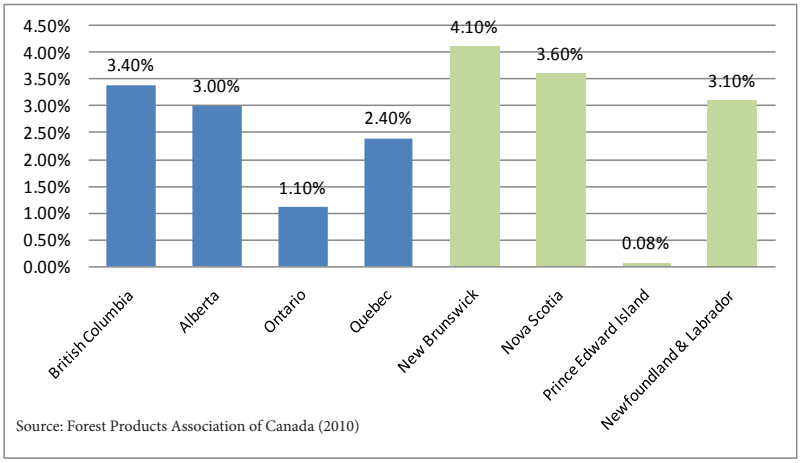
2006 = 140 MLB Members
2010 = 60 MLB Members

Market Diversification Strategy

Atlantic WoodWORKS! is a market diversification strategy. It is a recognized fact that there is an expanded degree of vulnerability from focusing on a single market. The downside of single market dependency have been exemplified by the impact on the region's producers and the economy in general, first in 1993 when the EU market was lost owing to phyto-sanitary barriers to trade and again in 2006 when the U.S. market collapsed, owing to several economic factors but directly related to the loss of housing starts due to the sub-prime mortgage crisis, and the strength of the Canadian Dollar.

To stabilize the health of the industry for long term success it's important a stable demand is created in local markets and serviced with local products.

Forest Products Contribution to Provincial GDP



Source: Forest Products Association of Canada (2010)

Wood Products Industry Employment

Province	Direct Jobs	Indirect
NB	11,900	4,165
NS	5,400	1,890
NL	1,900	665
PEI	600	210
Total:	19,800	6,930

Natural Resources Canada (2012)

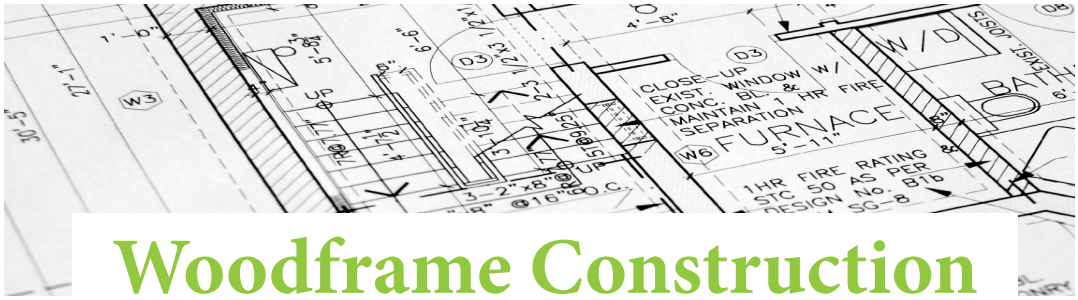
Economic Importance of the Atlantic Canadian Forest Industry

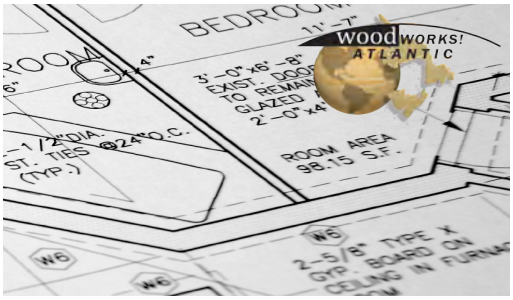
The forest Industry remains vitally important to Atlantic Canada and a major contributor to the regions manufacturing base. In total the Atlantic Canadian forest industry contributes the most significant source of export earnings after the energy sector (3.1 billion in 2007) and employs over 25,000 people around the region, about 70% of whom live in rural areas[1].

Forest industries also have important linkages to other parts of the economy: purchasing goods and services from local suppliers, inducing spending in local retail and contributing to government revenues. An earlier APEC study found that for every 100 direct jobs created in New Brunswick's forest industry, 35 jobs are indirectly created in other sectors of the provincial economy[2].

New Brunswick is the dominant player in the forest industry in Atlantic Canada, accounting for 63% of total output in 2005. Nova Scotia and Newfoundland and Labrador follow with 23% and 13% of Atlantic forest industry output respectively. Prince Edward Island's small forest industry accounts for about 1% of the Atlantic total. New Brunswick's share of output in Atlantic Canada's forest industry ranged from 58% in pulp and paper to 72% in the wood products industry in 2005[3].

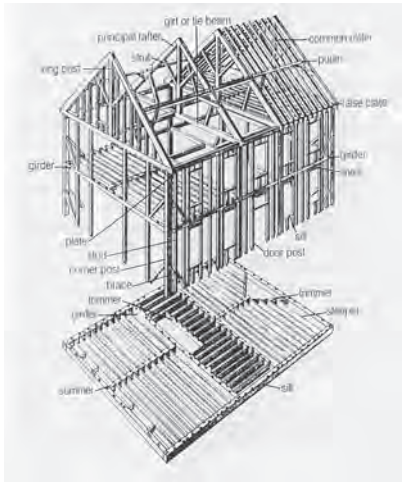
Sources:
[1] Atlantic Provinces Economic Council, . "Building competitiveness in Atlantic Canada's Forest Industries." Strategy for Future Prosperity. (2008): http://nbwoodlotowners.ca///uploads//Website_Assets/APEC_Report.pdf
[2] Floyd. W, Donald, and Rajendra Chaini. "Current Status, Future Opportunities." Atlantic Canada's Forest Industry. Part one (2007): http://publications.gc.ca/collections/collection_2010/apeca-acoa/Iu89-4-43-1-2007-eng.pdf
[3] Patrice Tardif Consulting, and Wood Science and Technology. "Increasing the use of wood in New Brunswick Public Buildings." (2010): http://www.unb.ca/fredericton/forestry/wstc/_resources/pdf/nbfpareport.pdf





Woodframe Construction

National Building Code Changes

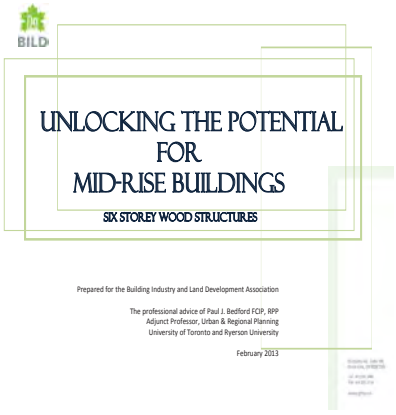


The National Building Code of Canada (NBCC) is under review to allow 6-storey woodframe construction. Currently the governing 2005 NBCC only allows a maximum of 4-storey woodframe construction.

- In 2009 British Columbia, after rigorous research and extensive consultation, changed its provincial building code to allow 6-storey wood construction.
- In 2013 Quebec ammended their provincial building code to allow 6-storey wood construction.
- In the summer of 2014, the government of Ontario announced that it is proposing amendments to the Ontario building code to permit the construction of 5- and 6-storey wood mid-rise buildings.
- Extensive scientific research has been completed in the following areas (to support the adoption of 6-storey woodframe construction):

  - Structural, Seismic, Fire, Acoustics & Building Envelope

Unlocking the Potential for Mid-rise Buildings



A report titled unlocking the potential for midrise buildings was commissioned by Ontario's building industry and land development association (BILD), to call on the Ontario Government to change the Ontario Building Code from 4 to 6-storey woodframe construction. The report concluded the following expected benefits:

- Increased availability of affordable housing - estimated cost savings of $30 - $40 per square foot of construction when compared to concrete and steel materials[1].
- 6-storey mid-rise residential buildings can be among the most economical structures for sustainable urban densification to prevent urban sprawl.
- Increased tax base for municipalities
- Minimized carbon footprint of building construction.
- Job Creation

Where the Savings Exist

According to the developers, architects, and engineers interviewed for Wood Solutions in Mid-rise Construction, the primary aspects of mid-rise light wood frame structures that reduce construction costs are: lower labor and material cost; reduced construction time; improved quality through off-site prefabrication; improved productivity levels; lighter construction (eliminates or reduces preloading requirements and can reduce concrete foundations in some cases); ease of running services; a wider range of labor available; and locally available resources[2].

Did You Know?

All over Canada, municipalities are finding that when they consider wood frame construction, more schools, health care and recreational facilities are being built.

Sources:
[1]Ontario Home Builders Association. "Wood is Good" (2013): http://ohba.ca/magazines/23/articles/58
[2] Wood Solutions in mide-rise. Jeff Walker, Walker Consulting Group (2013): http://www.owtfa.com/pdf/ON_Condensed_Report_FINAL_3.pdf

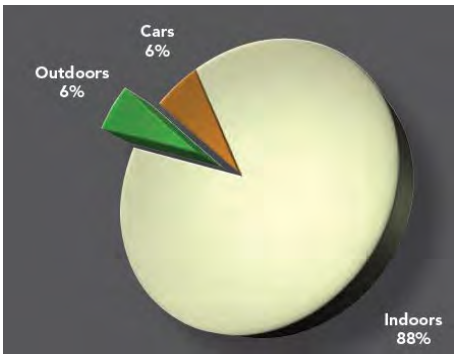
Building Performance

Insulative Properties of Wood

Wood is less conductive than steel and concrete

The natural durability of wood has been proven by the multitude of buildings that have stood for centuries...

Where Do We Spend Our Time?



The positive benefits of nature are highly desirable for stress reduction, recovery, attention and general healthy living. However, the average Canadian living in the modern era spends only 6% of their time outdoors. We spend an additional 6% in our cars and the remaining 88% of our time indoors[2]. In order to benefit from the stress-reducing and healing properties of nature we have to bring nature indoors.

Sources:

[1]Forest Products Association of Canada, , and Canadian Wood Council. "Canadian Wood. Renewable by Nature. Sustainable by Design. ." (2012): http://www.kwantlen.ca/__shared/assets/Cover_of_Canadian_Wood_-_Renewable_By_Nature_-_Cdn_Forest_Product_Assoc_-_June_20089491.pdf

[2] FP Innovations, . "Wood and Human Health." Strategy for Future Prosperity. 1 (2008): Web. http://www.fpinnovations.ca/MediaCentre/Brochures/Wood_Human_Health_final-single.pdf

[3] British Columbia Wood, . "Building green and benefits of wood." Naturally Wood. (2011): Web. http://www.naturallywood.com/sites/default/files/Building-Green-and-Benefits-of-Wood.pdf

Energy Efficient & Renewable

Forty percent of the energy consumed in North America is used to heat, cool and ventilate buildings; to light them; and to keep appliances running. Energy efficiency in building operations is critical to sustainable building. Wood is far more resistant to heat flow than other materials, which means it is easier to insulate. Wood is 400 times better than steel and 10 times better than concrete in resisting the flow of heat. This means more insulation is needed for steel and concrete to achieve the same thermal performance as with wood framing[1].

Green design often focuses on durability, for the purpose of conserving resources. This means ensuring that a structure will last or that it can be renovated if necessary. One way to achieve longevity is to design for adaptability. Perhaps wood buildings last so long in North America because they can be adjusted to accommodate changing needs. Recovering materials at the end of a building's life rather than sending them to landfill is another way to extend material longevity—and wood is well suited to deconstruction, recovery and salvage. When longevity is a challenge, then resource conservation typically involves the three Rs (reduce, reuse, recycle). These are especially important for finite non-renewable resources. There is a fourth R that is worth considering—a shift to renewable resources like forest products.

How Humans Respond to Wood

Using wood in institutional environments is proven to reduce stress, increase attention spans and improve the repair functions in the body to deal with immediate threats, like tests[2].

Using wood in hospital environments have been proven to increase healing times. The Credit Valley Hospital in Mississauga, Ontario is a great example. The new addition was Ontario's first fully integrated ambulatory care and cancer treatment center, that was completely refurbished with wood and engineered wood products. From the new renovations, successful indicators of the benefits of wood included[3]:

- Accelerated healing times
- Increase in patient and staff moral
- Reduction in staff absenteeism

All of which result in a better quality of life for patients and staff and not to mention, long term costs savings.

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Helpful Tips

10 Ways To Get Wood In Your Project

There are several things local governments can do immediately to ensure that wood is featured in your community projects:

1. Pass a WOODEQUAL resolution
2. Ask for an **EPD** when deciding on building materials, to compare their respective environmental impacts
3. Pass a WOODEQUAL bylaw to reinforce your WOODEQUAL resolution
4. Ask for wood at the outset, and keep on asking
5. Amend your procurement policy to reflect how important it is to use wood wherever possible
6. Embed your desire to use wood in the design of your projects into your Expressions of Interest to attract wood champions
7. Embed your desire to use wood in all your documents
8. Engage the local wood industry early on in the design process
9. Ask the right wood questions when conducting your interviews
10. Don't settle for just an architectural splash; seek and innovative structural wood solution
11. Ask "Why Not Wood" until you get an answer

10 Ways To Keep Wood In Your Project

Having adopted an appropriate wood design for your project, it is important not to let the wood out of your project. Many projects are originally designed with significant structural and architectural wood elements only to have the systematically removed as a result of ongoing decisions and trade-off's. Atlantic WoodWORKS! can help you keep the wood in your project. Expert technical advisors with Atlantic WoodWORKS! can help you in all of the following areas:

1. Engage the Atlantic WoodWORKS! technical advisors as soon as you start thinking about a new project
2. Be prepared to enforce your WoodEqual resolution, bylaw or procurement policy directives
3. Become knowledgeable. Develop a clear understanding of what you believe is possible with wood for your project - and insist on it
4. Having selected a wood-savvy design team, be clear with all team members that you expect to see all of the wood right through to the final implementation
5. Let your design team know that you are willing to work with them to deal with any and all issues that could result in wood being marginalized in the project
6. Educate and prepare the public about the benefits of having wood in the final building, and address any fears and concerns that may exist
7. Engage building officials at the outset; help them to understand the design and how the wood elements meet the performance requirements of the structure
8. Engage fire officials and explain how the design and implementation integrates with their access requirements, fire-fighting equipment, water pressures and other important factors
9. Work closely with quantity surveyors and stay involved in the ongoing cost analyses and trade-offs. Work with them toward solutions that keep wood in the building
10. RALLY YOUR COMMUNITY. Many communities across the Atlantic region are developing exciting and innovative examples of the diverse possibilities that wood products can deliver. This is garnering increasing international attention. Make sure your community knows that it can share in this pride.