Wood has always been a popular building material because it is easy to work with, durable, safe, comfortable and beautiful. As concern about climate change grows, wood becomes an even more attractive choice because it is a renewable resource and because of the fact that forests absorb and store carbon.

As the world’s population and the demand for resources increase, renewable resources such as wood provide consumers with a responsible choice. Canada’s diverse wood products can meet any construction or renovation need, and are backed by comprehensive laws and regulations, as well as third-party certification that prove they come from well-managed forests.

The use of new technology has increased the efficiency of wood. Engineered wood products are strong and versatile, allowing for the expansion of their use in larger commercial and public structures. The manufacturing of engineered wood reduces waste at every stage of production.

The choice of products used to construct, renovate and operate buildings has a huge environmental impact. Numerous life cycle assessment studies worldwide have shown that wood products have a smaller environmental footprint than other major building products.

Life cycle assessment is an internationally recognized methodology using quantifiable indicators. It can be used as part of decision-making to compare the environmental impacts of different building materials, construction methods and entire buildings throughout their existence.

Sometimes life cycle assessment leads to surprising conclusions. Original materials can be a better environmental choice than recycled products if the recycling requires a lot of energy—especially if the original product is renewable. The use of local products is environmentally preferable only if they reduce energy consumption and pollution.

The Athena® EcoCalculator for Assemblies is the simplified version of a life cycle assessment that allows architects, engineers and others to assess and compare the environmental implications of hundreds of building methods. This tool can be used to evaluate designs that are commonly used for both new buildings and renovations. It is available at no cost from the following website: www.athenasmi.ca

Tall Wood Buildings

Brock Commons Tallwood House is an innovative tall wood student residence at the University of British Columbia finished in 2017. Brock Commons is the tallest mass timber hybrid structure of its kind in the world at 18 storeys in height. The estimated avoided and sequestered greenhouse gases from the wood used in the building is equivalent to removing 511 cars off the road for a year.

The tallest wood-constructed condominium in North America, project Origine in Quebec City, includes a 12-storey wood structure on top of a one-storey concrete podium.

Designers are working towards 20 - 30 storey tall wood structures composed of mass timber: large-scale wood panel products which allow massive solid walls to be made from relatively small trees.
Green Building Rating Tools

A number of comprehensive rating systems are available to help building industry professionals evaluate the environmental performance of products or design options.

Effective systems offer a consistent, scientific basis for comparison, evaluate relevant technical aspects of sustainable design, and are uncomplicated to communicate and implement. The best systems avoid being prescriptive; instead they foster innovation and award performance.

Green building rating systems in North America that are commonly used include:

- **Green Globes** — a web-based management tool that includes an assessment protocol, rating system and a guide for integrating environmentally friendly design into commercial buildings.
- **Leadership in Energy and Environmental Design (LEED)** — a green building rating system that offers criteria for the design, construction and operation of high-performance green buildings.
- **The ICC 700 NAHB National Green Building Standard** — a standard developed by the U.S. National Association of Home Builders for all home builders and renovators that provides criteria for recognizing and rewarding green residential design, development and construction practices.

There are assessment tools in countries around the world, including Built Green and R2000 in Canada, the Building Research Establishment’s Environmental Assessment Method (BREEAM) in the United Kingdom and the Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) in Japan.

**Wood: An Excellent Green Building Choice**

Research has shown it takes less energy to produce wood products when compared with concrete, plastics, metals and other materials, and there are fewer impacts on air and water quality. Wood is renewable, and growing forests support countless environmental and social values.

As much as one-third of the energy produced in North America is used to heat, cool and operate buildings, therefore reducing energy consumption is a priority in green building. Wood has both natural thermal efficiency and a cellular structure—with tiny air pockets—that resists the flow of heat.

The benefits of wood are related to both the energy needed to operate the building and the embodied energy—which refers to all the energy, direct and indirect, required through the life of a product, from extraction to disposal. Embodied energy takes on greater importance as operating energy efficiency increases.

A U.S. study by the Consortium for Research on Renewable Industrial Materials (CORRIM), compared the environmental impacts of homes framed with wood, steel and concrete, and found that the production of steel and concrete-framed homes generated 26 per cent and 31 per cent more greenhouse gas emissions, respectively, than the wood counterpart. The same study also found that steel and concrete homes contain more embodied energy and release more air pollutants than the wood-framed home.

The best construction materials are durable enough to last the lifetime of a structure, and can be reused once the useful life of the building has ended. The versatility and flexibility of wood facilitates renovations. Current research also shows that wood offers the best opportunities for reuse after deconstruction.

Most North American buildings are demolished within 50 to 60 years because of changing needs. It is therefore, better to design them so they can be easily adapted to new uses or deconstructed so materials can be reused or recycled.

**Wood Frame Houses**

A typical North American wood-frame home contains 29 metric tonnes of carbon. This is the equivalent of offsetting the greenhouse gas emissions produced by driving a passenger car over five years (about 12,200 litres/3,200 U.S. gallons of gasoline).