

## Sustainable Essentials: Wood

**Structural construction of the world's tallest wood building completed four months ahead of schedule at the University of British Columbia (BC) in Vancouver.** The interior of the 18 storeys student residence will be completed by May 2017. Wood has a long history and a bright future as a sustainable construction material. Features and benefits of wood vary by tree species. Those attributes shared by all species include carbon storage, energy efficiency and renewability. Wood is undergoing a revival in product design.

Wood products are associated with less greenhouse gas emissions than building materials such as concrete, steel, aluminum, or plastic whose manufacturing are more energy intensive. Life cycle assessments show that steel and concrete framed homes have higher carbon footprints than their wood based counterparts. Air pockets in wood's cellular structure provide superior thermal efficiency, 400 times better than steel and 15 times better than concrete. Another great aspect of wood is its durability, so long as design and applications are appropriate. There are well designed wood buildings in Europe and Asia exceeding 1000 years in service life. Being reusable, wood can be recovered, restored and reused in construction using minimum energy.

Wood high-rise construction projects are moving forward around the world, with a 34-story wooden tower approved in Stockholm and architect Michael Green planning a 30-story tower in Vancouver. Highly engineered cross-laminated timber (CLT) is the building material of choice for these towers. The panels are made to order with precut windows and access for plumbing, ventilation and electrical service.

Gypsum panels and sprinklers fireproof interior spaces. The CLT based towers are designed so that weight is distributed over the entire vertical panel. Building codes require all building systems to perform to the same level of safety regardless of material used. What is surprising to most people is that mass timber buildings have safety advantages over steel and concrete buildings, not only in fires and strong wind events but also during seismic events. Research has proven that CLT buildings meet or exceed the most demanding earthquake and seismic design requirements.

There is renewed interest in using wood for furniture, wall panelling, millwork and cabinetry. It is seeing stable growth for use in paper despite the growth of digital media. Wood is converted to various chemicals and pharmaceuticals. While industry is cogenerating these chemicals as part of other industrial processes like wood pulp production, widespread manufacturing of chemicals is still limited. In 2014 the Ford Motor Company introduced wood cellulose reinforced plastic in the 2014 Lincoln MKX. This material replaces fiberglass reinforcement in the centre console reducing weight by 6% and the carbon footprint for the fiberglass it replaces.

**BC's Wood First program** is instrumental in providing incentives for research and industry to promote wood as a primary building material in new projects in BC, Asia and the US. **The Forest Industry is still a corner stone of the BC economy representing 36% of total exports, \$12.4 billion and employing 60,000 people.** Tapping the full potential of wood as a material benefiting our society, economy and planet requires ongoing research, innovation and promotion.



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# Sustainable Essentials: Water

**Water is vital to life as we know it. Water withdrawals tripled globally in the last 50 years.** Global water demand will increase by 55 percent between 2000 and 2050. 3.9 billion people will live in areas of high water stress by 2050. More than 1.4 billion people will be without access to basic sanitation, and 1.6 billion people will be living in areas at risk of flooding. **Effective water management is essential.**

Water dissolves most substances and is vital for transport of nutrients and wastes in and between cells. It changes phase to solid ice and evaporates to water vapour essential in the water cycle, water storage, heat exchange influencing our climate, erosion, and even plate tectonics. Only 2.5% of global water is available as freshwater. A universal solvent, it transports many biological and chemical pollutants harmful to life. Water quality is as large a concern, as water availability.

70% of global freshwater used by man is for agriculture. Water plays a significant role in our economy to grow food, process it, and thousands of other products. Water plays a critical role in providing and distributing energy, in cooling, transportation, sanitation, cooking, cleaning and recreation. Imagine turning on the tap and not being able to brew tea or coffee, flush a toilet or take a shower. In many parts of the world this luxury does not exist. Women and children spend 125 million hours each day collecting water.

**Canada ranks second to the US for per capita water consumption.** While the water needed by a person to survive is 5 litres/day and the minimum needed for sanitation, food preparation and bathing is between 50-80 litres/day, household consumption by Canadians is about 340 litres/day and total water use to support the Canadian lifestyle is 4400 litres/household/day.

More than 90% of water is used to support economic activity. Hydro-electricity supplies over 60% of the electricity

generated in Canada and represents 82% of the total demand for water. Another 5% of total water use is for thermal electric power generation with just 1% used in manufacturing and a negligible amount in irrigation. In 2015, new water pricing fees were introduced with the passage of the Water Sustainability Act in British Columbia. In January, 2016 water rental fees in general, doubled. Part of the reason for the stricter water pricing policy is due to increasing purchases of water licenses by foreign interests.

Chinese entrepreneurs have recently purchased water sources in BC and are exporting hundreds of containers per month of bottled freshwater to China. Growing demand for clean water worldwide, is generating debate on whether protectionist approaches to conserve water are necessary. The Ontario Government is introducing a moratorium on new or expanded water bottling plants effective January 2017. While BC businesses, individuals and communities face higher taxation, foreign business interests such as Nestle and many others are increasingly exploitive of undervalued water sources, water intensive crops and wood fiber resources in BC. USDA has just reported that 62 million trees perished due to drought in California in 2016. Global water pressure and competing interests will impact our local economy in ways we cannot yet foresee.

Strategies leading to less wasteful usage of water must be adopted by water dependent businesses looking to stay profitable over the long term. Communities must be conscientious of water use and supply, especially as they densify, and the province must protect domestic interests for this most valuable resource. Canada has a well deserved history as hewers of wood and drawers of water. Both are inextricably linked to one another, in forested watersheds that provide a sustainable supply of fresh water, food and a bounty of forest products now and into the future, if well managed. **Their stewardship is our responsibility.**



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