Wood and Green Building

USING WOOD TO FIGHT CLIMATE CHANGE

4

The issue of climate change is fueling pressure on governments to encourage and/or mandate green building standards for residential and commercial construction. In North America, the building sector accounts for about 37 percent of carbon dioxide (CO_2) emissions, which are generated when fossil fuels such as coal and oil are burned for energy. CO_2 traps heat in the earth's atmosphere that would otherwise radiate into space and is thought to be a major cause of global warming.

Green building standards are generally voluntary, but governments at all levels are setting increasingly strict energy and CO_2 reduction targets, which will in turn require increasingly efficient building practices. For example:

- The State of California has committed to reducing greenhouse gas emissions to 2000 levels by 2010, to 1990 levels by 2020 and to 80% below 1990 levels by 2050.
- Through the US Conference of Mayors, local governments across the country have focused on buildings, setting a target of 2030 as the year that all new city structures will have no net greenhouse gas emissions.
- The Mayor of Austin is considering building code changes that will require all new single-family homes to be approximately 60% more energy efficient than homes built to code today.

> "Promotion of wood products can act as a greener alternative to more fossil-fuel intensive materials. Substituting a cubic metre of wood for other construction materials (concrete, blocks or bricks) results in the significant average of 0.75 to 1 tonne of CO_2 savings."
>
> *International Institute for Environment and Development, Using Wood Products to Mitigate Climate Change, 2004*

Using Wood Products Fights Climate Change

Although it doesn't eliminate the need for energy efficiency and other CO_2 reduction strategies, the use of wood fights climate change in several ways.

1. Wood reduces the need to burn fossil fuels

Compared to other materials, wood requires less energy to extract, process, transport, construct and maintain over time.

One study, conducted by the Consortium for Research on Renewable Industrial Materials (www.corrim.org/reports), examined the impacts of using wood, steel or concrete in residential construction. Homes framed with wood and steel were compared in Minneapolis and homes framed with wood and concrete were compared in Atlanta–the framing types most common to each city. In both cases, the wood-framed homes required less energy (from extraction through maintenance) and had less impact on global warming.

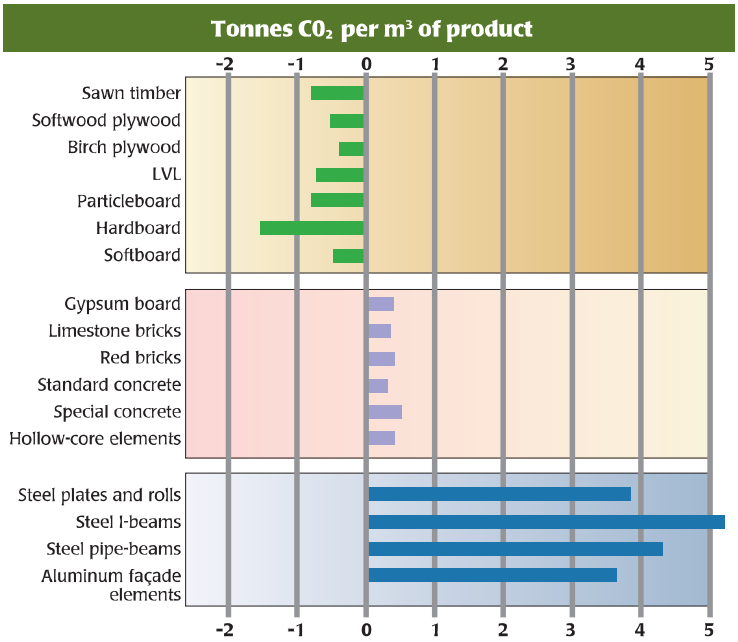
Comparison of Homes Framed in Wood, Steel and Concrete

Minneapolis	Energy (Gigajoules)	GWP* (Kilograms CO_2)	Atlanta	Energy (Gigajoules)	GWP* (Kilograms CO_2)
Wood frame	651	37,047	Wood frame	398	21,367
Steel frame	764	46,826	Concrete frame	461	28,004
Difference	17%	26%	Difference	16%	31%

Source: Consortium for Research on Renewable Industrial Materials
**Global Warming Potential*

"Wood and Green Building" is a series of fact sheets produced by the Wood Promotion Network for the industry and its customers. Copies are available online at www.beconstructive.com.

Net CO_2 Emissions: How Wood Compares



This data on the life cycle carbon dioxide emissions of different building materials was generated in Europe, which committed to ambitious CO_2 reduction targets through the Kyoto Protocol. The CO_2 absorbed by growing forests and stored in wood products offsets the energy required to harvest, process, transport and maintain those products over time—which is why their net emissions are below zero.

Source: Building Information Foundation, RTS; CEI-Bois

2. Wood is a better insulator than other materials

Wood's cellular structure contains air pockets that limit its ability to conduct heat, which makes it a better insulator than other materials—15 times better than concrete and 400 times better than steel. This helps to minimize the energy needed for heating and cooling. Steel and concrete, on the other hand, are solid throughout and, as a result, facilitate heat loss through a building's walls and increase energy consumption.

3. Growing forests absorb carbon dioxide

While humans contribute CO_2 to the atmosphere by burning fossil fuels, growing trees absorb CO_2 and release clean oxygen. The CO_2 is stored—a process known as carbon sequestration—either in the trees or wood products made from the trees, until they burn or biodegrade.

Forests have the potential to significantly impact atmospheric levels of CO_2, for better or worse. Trees absorb the most CO_2 while they're young and growing vigorously. At a certain point, usually between 50 and 300 years depending on the species and growing conditions, absorption tapers off. If the forest is allowed to decay, the stored CO_2 is released back into the atmosphere. If it's harvested sustainably and manufactured into building products, the CO_2 is stored in the products while the forest regenerates with young trees that absorb even more CO_2—thus achieving a net reduction in global emissions.

Active management, which involves thinning the forest and clearing debris, also has a positive effect because it helps to reduce the number and intensity of wildfires, which emit huge quantities of CO_2. Forest biomass that's burned for energy through clean processes such as cogeneration also adds to the plus side of the equation because it reduces the need to burn fossil fuels.

Wood and Green Building Standards

Green building standards don't address the impacts of building materials on climate change directly, but they are increasingly giving preference to materials chosen through a process called life cycle assessment (LCA)—which factors in the full range of environmental impacts, including global warming potential.

Sustainable forestry practices, which can increase the amount of CO_2 absorbed from the atmosphere and stored in trees or wood products, is addressed in green building systems that give preference to wood certified through credible programs such as the American Tree Farm System (ATFS), Canadian Standards Association (CSA), Forest Stewardship Council (FSC), and Sustainable Forestry Initiative (SFI).