



Climate Change: Causes and Consequences

The Fourth Assessment Report, released by the Intergovernmental Panel on Climate Change in 2007, states: “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.”¹

The consequences of climate change are difficult to predict because of the complexity of environmental systems that determine climate, but some of the trends are already clear:

- Changes in natural habitats will result in the loss of plant and animal species.
- Species that carry tropical diseases, such as mosquitoes (malaria), will spread and settle into new areas.
- Sea levels will continue to rise, with catastrophic results for those living in coastal or river delta area, or low-lying land.

1. Climate Change 2007: Synthesis Report. Intergovernmental Panel on Climate Change. www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

Using Wood Can Help Tackle Climate Change

To mitigate climate change, it is necessary to reduce greenhouse gas emissions and store more carbon. A well-managed forest can do both.

As trees grow, they absorb carbon dioxide and store it. When they decompose or burn, much of the stored carbon is released back into the atmosphere, mainly as carbon dioxide, and some of the carbon remains in the forest debris and soils.

Wood products continue to store much of the carbon absorbed during the tree’s growing cycle, while the regenerating forest once again begins the cycle of absorption. Manufacturing wood into products also requires far less energy than other materials, and most of that comes from residual biomass (such as bark and sawdust).



Photo: Brudder

Greenhouse Gases, Carbon, and Forests

The Greenhouse Effect

The glass panels of a greenhouse let in light and keep heat from escaping, providing warmth for the plants growing in them. A similar process occurs when the sun’s energy reaches the Earth – some is absorbed by the Earth’s surface, some radiates back into space, and some is trapped in the Earth’s atmosphere, which keeps the planet warm enough for life to flourish. This is called the greenhouse effect.

The carbon cycle affects the amount of energy trapped in the atmosphere. Plants absorb carbon dioxide and emit oxygen during photosynthesis; oceans also absorb carbon dioxide. Humans and other animals inhale oxygen and exhale carbon dioxide. Carbon dioxide is emitted when substances decompose or burn.

Scientists agree this natural balance has been upset. The biggest human cause is the amount of carbon dioxide being released into the atmosphere through the burning of non-renewable fossil fuels, such as oil, natural gas or coal. Carbon dioxide accounts for more than 75 per cent of total greenhouse gas emissions.

Close to eight billion tonnes of carbon dioxide are emitted every year – most of this through fossil fuel combustion and deforestation in tropical regions. Some is absorbed by water bodies, some is absorbed by forests – and some is emitted into the atmosphere.

If too much carbon is emitted, it causes the atmosphere to trap more heat, warming the planet. Rising temperatures may, in turn, produce changes in weather, sea levels, and land use patterns, commonly referred to as climate change.



Carbon sequestered in a typical 2,400-square-foot North American home is the equivalent of offsetting the greenhouse gas emissions produced by driving a passenger car over five years (about 12,500 litres of gasoline).

Solid Wood and Climate Change

Using wood products that store carbon instead of building materials that require large amounts of fossil fuel energy to manufacture can help to reduce greenhouse gases in the atmosphere. Trees grow naturally, and the little waste generated during processing is often used to meet the energy needs of the mill. At the end of their first life, forest products can be easily reused, recycled or used as a carbon-neutral source of energy.

A typical 2,400-square-foot wood-frame house contains 29 metric tonnes of carbon, which is the equivalent of offsetting the greenhouse gas emissions

produced by driving a passenger car for five years (about 12,500 litres of gasoline).² No other material offers this kind of carbon credit.

Around the world, government and business leaders are developing policies and procurement processes that encourage the use of more forest products from well-managed forests.

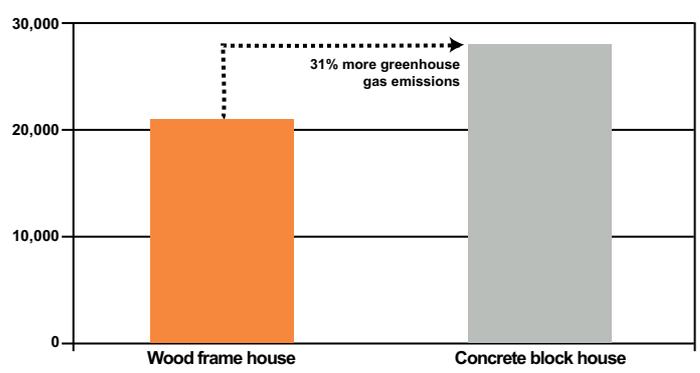
2. Generating More Value From Our Forests. Ministry of Forests, Lands & Natural Resource Operations. https://www.for.gov.bc.ca/het/valueadded/valadded_report.pdf

Life cycle assessment is the appropriate tool for examining the carbon footprint of building materials because it considers the greenhouse gas emissions associated with their production, transportation, construction, use and eventual disposal.

- In this graph, the embodied effects are shown for two typical, identical homes, one made with wood and one with concrete. (Embodied effects are the environmental impacts associated with manufacturing, transporting and constructing the houses – heating and cooling the houses are not included);
- It shows that the concrete-block house resulted in 31 per cent more greenhouse gas emissions than the wood-frame house.

Data: Consortium for Research on Renewable Industrial Materials (CORRIM).

Embodied Greenhouse Gas Emissions: Wood Frame Vs Concrete-Block House





Library Square, Kamloops, B.C.

Architect: JM Architecture

Photo: Martin Knowles

Library Square is a six-storey mixed-use development that includes five stories of wood-frame housing over a 20,500-square-foot library and 15,000 square feet of retail space.

Green buildings

- Mitigate climate change
- Use less energy and water
- User fewer materials
- Reduce waste
- Are healthy for people and the planet

WOOD STORES CARBON

Library Square, Kamloops, BC - a 6-storey mixed-use development, stores 2,340 metric tons of **CO₂**.

2,340
METRIC TONS OF CO₂



**EQUIVALENT TO THE ENERGY USED
TO OPERATE A HOME FOR 620 YEARS**



On the cover:

École au Coeur de l'île Comox, Comox B.C.

Architect: McFarland Marceau Architects

Photo: Derek Lepper

naturally:wood®

British Columbia wood. Sustainable by nature. Innovative by design.

Source: WoodWorks Carbon Calculator for Buildings and US EPA
Use the carbon calculator to estimate the carbon benefits of wood buildings. Visit woodworks.org.