

# The Issue

Life-cycle Assessment is a technique to assess environmental impacts associated with all the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair, maintenance, decommissioning, recycling and landfilling. The full carbon life cycle of softwood wood products is described below

# Life Cycle Assessment Steps

A full accounting of the carbon impacts of wood-based building products, i.e. a Life-Cycle Assessment (LCA), begins with the construction of the forest access roads, the harvesting of wood from the forest, its transportation to the mill and other facilities where it is manufactured into a building product, its use over the operational life in a building structure, and finally, its decay or reuse after disposal. The steps involved in conducting a Life Cycle Assessment for harvested wood products are shown in the following chart.

#### Figure 1: Cradle to Grave Lifecycle Model



Energy consumption and greenhouse gas emissions are recorded for all phases of the harvest woods life cycle. Including forest harvesting, roundwood transportation, wood product manufacturing and construction site activities, building life usage, and end of life activities including recycling and landfilling.

### Life Cycle Assessment

Estimated carbon equivalent emissions data associated with fossil fuels was tabulated for each of the steps shown in Figure 1. These estimates were derived from a Life Cycle Assessment of softwood lumber by the Athena Materials Institute and a life cycle spreadsheet model developed by Athena. These LCA percentages are order of magnitude only. See Figure 2.

### Figure 2: Cradle to Grave Breakdown



These percentage distributions will vary considerably depending on a multitude of factors including the amount of wood slash, use of this slash, type of manufacturing plant (integrated or single facility), trucking distances and the incidence of recycling, landfilling and waste management practices.

## **Carbon Neutrality**

This entire Life Cycle Assessment from cradle to factory gate and from factory gate to grave is premised on the acceptance of the carbon neutrality assumptions where biogenic CO2 emissions are considered carbon neutral as the trees that were cut down had previously photosynthesized (absorbed) this carbon, and, reemitting it back into the atmosphere was simply releasing the amounts absorbed.

This "carbon neutrality" concept is being challenged on several fronts. For example, many commercial trees take up to 100 years to regenerate, particularly in the Pacific Northwest. When Old Growth forests are logged, this 100-year timeframe becomes considerably longer.

In addition, logging disturbs the soil organic carbon which begins to decay rapidly and emits methane, nitrous oxides and CO<sup>2</sup> as the forest canopy is no longer protecting the soil biomass from the sun.