



Life-Cycle Inventory Analysis of Laminated Veneer Lumber Production in the United States

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Summary:

Documenting the environmental performance of building products is becoming increasingly common. Developing environmental product declarations (EPDs) based on life-cycle assessment (LCA) data is one way to provide scientific documentation. Many U.S. structural wood products have LCA-based “eco-labels” using the ISO standard. However, the standard requires underlying life-cycle inventory (LCI) data to be of recent age. This study updates the gate-to-gate manufacturing LCI data for laminated veneer lumber (LVL) for Pacific Northwestern (PNW) and for southeastern (SE) United States. Modeling the primary industry data per 1.0 m³ of LVL through LCI analysis provides the inputs and outputs from veneer logs to LVL starting at the forest landing. For PNW and SE, cumulative mass-allocated energy consumption associated with manufacturing 1.0 m³ of LVL was found to be 5.64 and 6.87 GJ/m³, respectively, with about 25% of the primary energy derived from wood residues. Emission data produced through modeling found that estimated biomass and fossil CO₂ emissions in kg/m³ were 127 and 139 for the PNW and 108 and 169 for the SE. One m³ (~535 OD kg wood portion) of LVL stores about 980 kg CO₂ equivalents. The amount of carbon stored in LVL thus exceeds total CO₂ emissions during manufacturing by about 350%. This study provides the necessary gate-to-gate LVL manufacturing LCI data for the cradle-to-gate LCA to develop an updated EPD.

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