Bio-pathways: Carbon Footprint Report
January 2011

Forest Products Association of Canada[1]

Executive Summary

Overview

Phase One of the Bio-pathways Project considers the socio-economic and environmental attributes of individual pathways. How forest products perform in relation to the environment is a vital element of this consideration, and one of significant interest to stakeholders, public policy decision makers, and markets alike. The carbon footprints of the pathways were selected as a leading environmental indicator.

A recent study carried out by the Forest Products Association of Canada[1] provided a region-specific assessment of the carbon footprints of individual bio-pathway products and mill configurations. A cradle-to-grave analysis including substitution effects was conducted. The substitution effect was of particular interest because the emerging bio-products have the potential to substitute for more carbon intensive products in the marketplace today. The study did not explicitly look at forest carbon stock impacts. This will be assessed in future work.

Scope of Analysis and Approach

Carbon footprints were completed at mills in each of three Bio-pathways study regions: central interior B.C.; northwestern Ontario; and Saguenay/Lac St. Jean, Quebec. The approach followed was similar to that of a full life cycle assessment, only narrower in scope, as the study did not consider other environmental impacts. The analysis involved a complete cradle-to-grave footprint, and involved three greenhouse gases: CO2, CH4 and N2O. To calculate carbon equivalencies, the global warming potentials used are those identified by the Intergovernmental Panel on Climate Change (IPCC). Carbon footprints were prepared using the Forest Industry Carbon Assessment Tool (FICAT), with input data from the Bio-pathways model.

Key Findings

- There is considerable variability among the pathways and types of emissions (i.e., direct and indirect).
- Direct and indirect emissions are driven significantly by the type of fuel and carbon intensity of the electricity used in product manufacture.
- Wood product pathways have the greatest potential for neutral or negative carbon footprints, due to their ability to store carbon over the long term.
- The substitution effects of biomass-based products/production represent a relative benefit when compared with products from other materials.
- Of the three regions analyzed, Quebec had the best cradle-to-grave emission performance, due to the low carbon intensity of its electricity grid.
- British Columbia produced the lowest transportation carbon intensity, due to transporting larger trees and shorter haulage distances.
- Ontario had the greatest carbon footprint, largely due to its carbon-intensive electricity production.
- The substitution of selected products used in current markets in favour of products made from wood fibre can potentially result in substantial emissions reductions.

[1]Paul Lansbergen, with support from the Canadian Forest Service and the National Council for Air and Stream Improvement

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Conclusions and Next Steps

All of the pathways studied seem to have a neutral or negative net carbon footprint, showing that carbon storage and substitution effects could potentially compensate for positive emissions from harvesting and manufacture. Wood and bio-energy substitution from fossil-based products can lead to significant carbon benefits, since solid wood products sequester carbon, strongly contributing to their neutral or negative carbon footprint. Due to the complexity and variety of bio-chemicals, more analysis is required to fully assess the substitution effects of these products.

Learn more

To find out more about the Bio-pathways II project and how Canada's forest industry is moving up the forestry value chain: www.fpac.ca/bio-pathways, www.fpinnovations.ca/bio-pathways.

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