Environ Biocomposites BIOFIBER Wheat Panels

Product Selection and Description

Environ Biocomposites, LLC BIOFIBER Wheat is a decorative biobased composite material made from wheat straw. An industrial-grade version known as MICROSTRAND Wheat is used as a rapidly renewable alternative for typical particle board or medium-density fiberboard applications. BIOFIBER wheat is intended for several interior applications, including tables, horizontal surfaces (transaction and work surfaces), cabinetry, furniture, and architectural applications.

For the BEES system, the functional unit for composite panels, regardless of the application, is 0.09 m^2 (1 ft^2) of panel.

Flow Diagram

The flow diagram below shows the major elements of the production of this product as it is currently modeled for BEES.

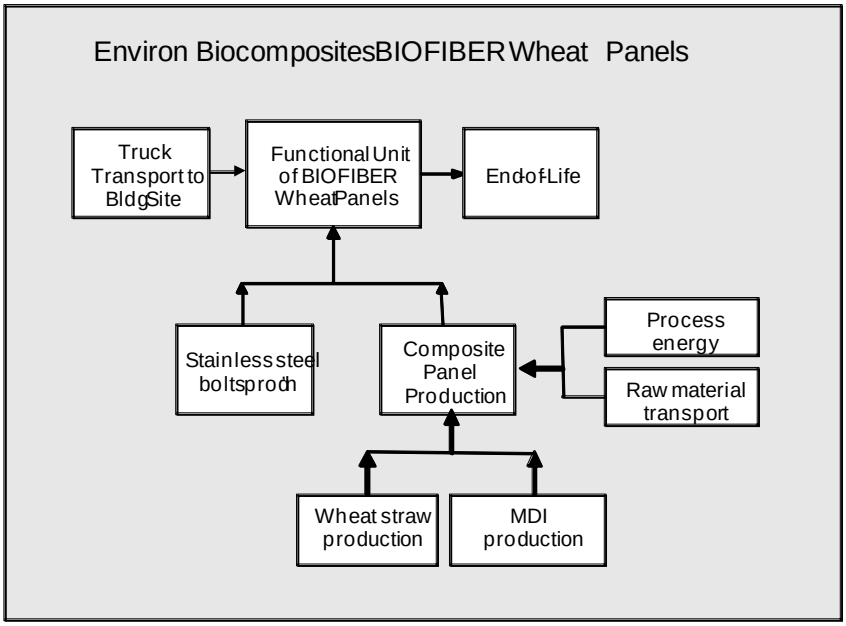

Figure 1: BIOFIBER Wheat Decorative Panel System Boundaries

Raw Materials

BIOFIBER wheat is composed primarily of wheat straw and methylene diisocyanate (MDI) resin. The wheat straw is a byproduct of wheat production, and in many cases it is left on the field after harvesting of the wheat. Wheat straw production is therefore not allocated to wheat production, meaning it does not share any of the inputs or outputs of wheat production. However, the farm equipment energy used to collect the straw is included: a European source reports that collection of 1 000 kg (2 205 lb) of straw requires 0.7 L (0.2 gal) of diesel and the packaging and baling requires an additional 2.5 L (0.66 gal).[1] The transportation of the wheat straw to the manufacturing plant is included.

The MDI resin data is based on U.S. data from the 2000s and comes from the US LCI database.

[1] European Energy Crops *Inter*Network, "Harvest of energy grain in Austria," Document No. B10087, 1997. Found at: http://www.eeci.net/archive/biobase/B10087.html.

Manufacturing

Energy Requirements and Emissions. Manufacturing 1 kg of BIOFIBER wheat requires purchased electricity and natural gas in a boiler in the following amounts:

Table 1: BIOFIBER Wheat Decorative Panel Energy Requirements

Energy type	*Quantity per kg*
Electricity	1.8 MJ (0.51 kWh)
Natural gas	43.3 J (0.041 therm)

No quantifiable emissions or water effluents are emitted during manufacturing.

Solid Waste. During manufacturing, about one-tenth of the straw that comes in is generated as dust. This dust is collected and stored and generally given away as animal bedding.

Transportation. The wheat straw is transported approximately 241 km (150 mi) to the manufacturing facility while the MDI is transported 1 143 km (710 mi). All materials are assumed to be transported by diesel truck, which is modeled based on the US LCI database.

Diesel truck transportation represents transport of BIOFIBER wheat from the Environ Biocomposites facility to the customer. BIOFIBER wheat is shipped everywhere in the U.S., with the transportation distance averaging 2 414 km (1 500 mi). Diesel trucking is modeled based on the U.S. LCI database.

Use Phase

The BIOFIBER wheat panel is installed using stainless steel bolts. It is assumed that, on average, 0.0023 kg (0.0051 lb) stainless steel bolts are needed to install 0.9 m^2 (1 ft^2) of panel. The production of steel comes from the US LCI database. Approximately three percent of the panel is lost as waste during the installation process due to cutting the panels to fit the installation area.

No outgassing solvents are added to the product during manufacturing, so no VOCs are emitted from BIOFIBER wheat.

End-of-Life

The BIOFIBER wheat panel is assumed to have a lifetime of 50 years. After year 50, the panel is removed and its full mass quantity is sent to a landfill.

References

Life Cycle Data

National Renewable Energy Laboratory (NREL): *U.S. Life-Cycle Inventory Database*. 2005. Golden, CO. Found at: http://www.nrel.gov/lci/database

PRé Consultants: *SimaPro 6.0 LCA Software*. 2005. The Netherlands.

European Energy Crops *Inter*Network, "Harvest of energy grain in Austria," Document No. B10087, 1997. Found at: http://www.eeci.net/archive/biobase/B10087.html.

Industry Contacts

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