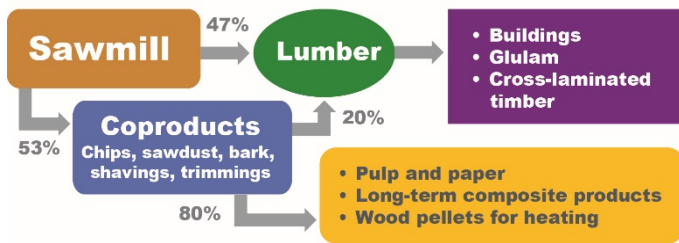


Wood residue use in wood composite panels yields efficient resource use and optimal carbon mitigation

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Stricter standards for greenhouse gas reductions and increasing public pressure have boosted interest in replacing fossil fuels with fuels made from clean wood residues from sawmills, e.g., wood pellets or biofuels. But using residues for fuels instead of in long-term products like wood composite panels (WCP) may produce unintended consequences—such as greater carbon emission than would occur if residues were used in WCP.

Allocation of Wood Flow through SE Softwood Lumber Mill



WOOD RESIDUES AS COPRODUCTS

Although the main product from most softwood sawmills is lumber, wood residues or *coproducts* are also generated when the round-shaped logs are processed into rectangular boards. Coproducts can include chips for pulp and residues such as sawdust, shavings, bark, and wood waste used for panel products, landscaping, pet bedding, and fuel. The US softwood lumber industry produces an estimated 19 million metric tons BDMT (21 million BDT) per year of coproduct—which can represent over half of the log mass entering the sawmills.

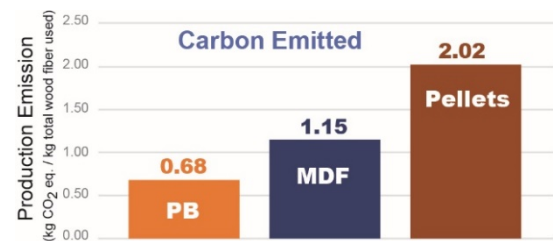
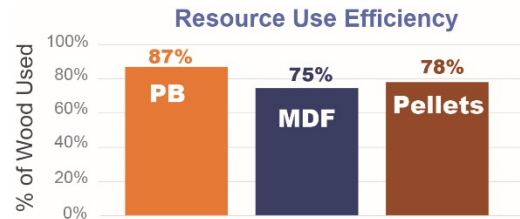
Coproducts can be sold as feedstock for pulp and paper, liquid biofuels, wood pellets, and wood-panel products for long-term use, such as medium density fiberboard (MDF), particleboard (PB), and hardboard. Recent surveys of US wood industries estimate the softwood residue demand at 8.6 million BDMT per year. Not all of the coproducts produced by lumber producers get sold, however. Most producers use these residues for energy generation to avoid using non-renewable fuels for wood drying. This self-generated biofuel not only comes at a low environmental and economic cost, but with a direct reduction in carbon emissions.

Over the past 20 years, CORRIM researchers have documented the environmental consequences of using coproducts to produce both short-

lived energy products such as wood pellets and biofuels and long-lived wood products such as WCP. The results are reported in terms of resource efficiency, carbon emissions, and the substitution of non-renewable materials to determine the best products for optimal carbon mitigation.

FINDINGS

- WCP have greater resource use efficiency: 87% of wood feedstock input ends up in the final product, compared with 78% for pellets.
- WCP store carbon while the panels are in use—whereas pellets release their stored carbon as CO₂ as soon as they are used.
- Using residues for WCP provides the greatest reduction of carbon emissions (3.91-13.58 kg CO₂e) compared to using residues in pellets versus fossil fuels (0.21-0.82 kg CO₂e).



Carbon Emissions Displaced : Carbon Stored in Product

Displacement (carbon NOT emitted), kg/kg, when using a renewable material for a wood product or fuel source

Particleboard : Plastic	3.19 kg CO ₂ e
Particleboard : Glass	4.31 kg CO ₂ e
MDF : Steel	13.58 kg CO ₂ e
MDF : Cement	4.74 kg CO ₂ e
Pellets : Natural gas	0.21 kg CO ₂ e
Pellets : Fuel oil	0.82 kg CO ₂ e

SUMMARY

Using wood residues in wood composite panels rather than in wood pellets or biofuels is a more efficient use of resources and optimizes carbon mitigation. When a WCP is used instead of a common alternative building material (i.e., plastic, glass, steel or cement), there is a direct and more significant **reduction** in the carbon emitted into the environment. For example, for every kg of MDF product used instead of a cement material, nearly 14 kg of CO₂e is not released into the environment. By comparison, when wood pellets are substituted for fossil fuels, the reduction in CO₂e emissions is less than 1 kg, significantly less than the carbon reduction realized by WCP.

Coproduct End-Use Pathways

