Clean Energy Transition Institute

Wood Products Industrial Emissions and Decarbonization Strategies

Washington State Clean Materials Manufacturing

	Lifecycle Phase	Dominant Emissions Sources	Decarbonization Strategies
UPSTREAM	Raw material extraction	Carbon dioxide and other greenhouse gas emissions from open burning/decomposition of logging residue. Fossil fuels used by logging equipment.	
	Raw material transportation	Fossil fuels used to transport harvested timber to mills and manufacturing facilities.	
PRODUCTION PHASE	Product manufacturing	Combustion of fossil fuels and biomass to produce electricity, heat, and steam used in the manufacturing process. Fuel combustion and electricity consumption used to run mill equipment and rolling stock (e.g., forklifts, log loaders, trucks).	Energy Use Efficiency: Emissions from electricity generation and onsite heat production could be reduced by installing energy efficient equipment at facilities and deploying systems for waste heat capture and reuse, and combined heat and power. Electrification: Lower heat requirements than many other industrial subsectors enable electrification in wood products manufacturing, including solutions such as ultraviolet wood
	1		curing, industrial heat pumps, and electric machine drives. ¹
	Waste-product disposal/reuse	CO ₂ emissions and other greenhouse gas emissions from open burning/decomposition of lumber mill residue. Methane emissions from landfills.	
DOWNSTREAM	Delivery and end-use	Fossil fuels used to transport wood products to customers.	Material Efficiency: Circular economy strategies, such as increased wood product recycling and use of biomass waste streams throughout the product value chain (e.g., forest residues
	End-product disposal/reuse	Landfill emissions from decomposition of organic material in wood products. Emissions resulting from new raw material procurement and manufacturing that could be avoided with greater recycling.	and lumbermill/sawmill biomass residue), could reduce energy use by the industry.

NOTE: This diagram focuses on selected decarbonization strategies to reduce production phase and downstream emissions only and is based on the characterization tables and report that CETI and SEI-US produced for the **Washington State Industrial Emissions Analysis**.

Melanie Kenderdine et al., "Optionality, Flexibility, & Innovation: Pathways for Deep Decarbonization in California" (Energy Futures Initiative, 2019), https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/5cadebd04cd61c00017a563b/1554901977873/EFI+California+Summa-ry+DE+PM.pdf.