

Public Abstract

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Title:The Economic Feasibility of Woody Biomass Harvest Practices in Missouri: The Cost of Harvesting Tops and Small Diameter Trees

Woody biomass materials which include timber harvest residues, such as tree tops and small diameter trees, have the potential to be an important source of renewable energy. Their use as an energy feedstock is partly dependent on whether the materials can be harvested in a cost-efficient manner. In order to estimate the cost of harvesting woody biomass, a whole tree (WT) system that extracted tops and a whole tree system that extracted tops and small diameter trees (WTSD) were compared on 30 acres of Missouri forestland. Each system simultaneously removed woody biomass and conventional solid hardwood products (SHWP) in an integrated harvest. A mechanized system consisting of a feller-buncher, grapple skidder, and loader was used for both harvest systems. Activity sampling and time-in-motion data were collected to determine system efficiency. Joint cost analysis was used to separate costs associated with harvesting SHWP and woody biomass. Marginal cost analysis treated the tops of SHWP as a by-product. Total cost estimates per ton of material delivered to the landing at a 5% interest rate were \$35.25 for SHWP and \$5.76 for woody biomass in the WT system and \$32.82 for SHWP and \$8.81 for woody biomass in the WTSD system. With the addition of a chipper, woody biomass costs increased to \$11.11 per ton in the WT system and \$14.16 per ton in the WTSD system. A sensitivity analysis tested the effects of changes of different costs on the cost per green ton of SHWP and woody biomass.