A Supply Chain Model for Optimizing Fixed and Mobile Bio-oil Refineries at a Regional Scale

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Abstract
A vital need to decrease the level of greenhouse gas emissions and the tendency of nations to reduce their dependency on imported oil, have created a new mission for society: To increase the robustness of the environmental and economic aspects of woody biomass to bio-oil supply chains. Mobile processing has been developed in recent years to facilitate bio-oil production from woody waste and to reduce overall bio-oil supply chain cost. However, questions surrounding the environmental and economic benefits of using mobile processing plants in combination with large-scale non-mobile (fixed) processing plants remain unanswered. The research presented develops a mathematical model capable of assisting decision makers in determining the optimal combination and location of fixed and mobile bio-refinery plants for a known woody waste supply stream and set of harvesting areas. The application of the model indicates that the utility of a mobile processing plant aligned with a fixed processing plant is more obvious when transportation cost and distance increase. In addition, this study seems to confirm the premise that transferring bio-oil to a processing facility is often more preferable than transporting woody biomass.

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