

43. ENERGY CONSUMPTION BY ENERGY WOOD SUPPLY

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Renewable energy resources, including biofuels, have received considerable attention in recent years. The amount of energy used to harvest and transport biomass in relation to the amount of energy harvested is an important factor in the assessment of energy gain this energy carrier represents.

The aim of the study was to determine the energy consumption of forest fuel supply chains. Three different chains were analysed: stemwood, small diameter trees and logging slash. The entire chain from harvesting to final delivery to energy plant was included. By-products from forest industry and stumps were not included in this task. The indirect energy use, like construction of machines, roads etc., were not taken into account.

By comparing different logistic chains and systems, it was possible to analyze which operations that was more energy effective than others. The analysis was based on previous research of productivity and fuel consumption of harvesting, chipping and transportation of industrial wood and forest fuel. Out of that data, the total energy consumption for the whole chains were calculated. The results showed that the direct energy consumption by harvesting and transportation of forest fuel is very little compared to the energy output of the fuel. For a typical supply chain from forest to energy plant, the input versus output of energy was approximately 3.2 % for stemwood, 2.8 % for small diameter trees and 2.5 % for logging slash.

It is important to notice that there are a number of uncertainties when calculating the fuel consumption of the various supply chains. For instance varies transport lengths, which affect consumption significantly. In addition, it is important what the energy content of the product harvested and transported represents. It will include a huge difference between harvesting stemwood of oak, which has high energy content, compared with harvesting small diameter trees of spruce with low middle dimension. In addition, there are variations between seasons, for example consumes forestry machines more fuel in the winter when there is a lot of snow.



Figure 1; Consumption of diesel oil divided on different assortments. Litres of diesel / m³ solid of wood supplied.

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