

Abstract

The costs and energy consumption of the transport of forest wood and animal manure for energy are assessed. Three key questions are asked:

- (i) what are the major paths traveled by forest wood and animal manure in Switzerland;
- (ii) how often are these resources transported;
- (iii) how far can they be carried before transport cost and energy consumption exceed the potential output of the resource?

By the mean of qualitative interviews, the most common traveled path of the two resources are identified using a mental model approach. Their costs are estimated as a function of time and compared to the final potential income generated by the resource. The energy inputs are calculated on the fuel or power consumption of the machinery involved in the different steps of the processes and compared to the final energy delivered by the feedstock. The findings show that expenses induced by firewood transport are twice as high as wood chips production due to the smaller delivered quantities. They also demonstrate that the possible travel distances are restrained by the cost of transport rather than the energy requirement. Firewood can be transported up to 90 kilometers, and chips 510 kilometers before the costs of the process outreach the potential income from the fuel; distances of 330 km and 16 km should not be exceeded for solid and liquid manure. The energy contained in the wood would suffice for thousands of kilometers before being energetically inefficient, but liquid manure should remain within regional boundaries of 45 km. The hauled volume has a significant impact on the efficiency of the process, and professional transport should be prioritized. Agricultural modes of transport are not recommended for liquid manure. These findings shed light on the effective maximum distances of consumers for this type of feedstock and could provide useful insight for practitioners and decision-makers.