

## **A REGIONAL-SCALE GIS-BASED EVALUATION OF THE POTENTIAL AND SUPPLY COSTS OF FOREST BIOMASS IN SWEDEN**

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**Abstract:** *In this paper the potential of harvestable slash (branches and tops) and stumps from final fellings and small trees from early thinnings for 4 regions of Sweden are provided. Marginal cost curves are calculated for slash and stumps through a GIS-based method. The method is based on forest inventory plots, selected combined heat and power plants and terminals. Four supply chains for slash and 2 supply chains for stumpwood are compared. Based on the geographic location of each facility and each terminal a list with the GPS coordinates of all facilities and terminals was made. The distance from the center of each forest inventory plot to the nearest receiving point, either plant or terminal, was estimated. Fixed and variable costs of harvesting equipment and transport vehicles were used for appreciating the costs of each of the supply systems under consideration. The forwarder extraction costs were a function of the extraction distance to the nearest forest road. Road transportation costs were, in the same way, a function of the distance to the nearest terminal or facility. The rest of the equipment was allocated a fixed cost per oven dry tonne of biomass.*

*There were large differences among regions in the estimated potentials of slash, stumps and small trees. The overall potentials for the 4 different regions differed from 1.07 to 2.95 million oven dry tonnes annually. Region Southwest presented the steepest slopes of the marginal cost curves. For the other regions the sloping up was less dramatic. Economic availability of slash and stumps was best for the regions North and South.*

*The economic availability of slash and stumps in each region is a very important information for biofuel suppliers and receiving facilities. The regional potentials and the marginal cost curves together show that enough or close to enough slash and stumpwood could be provided to the facilities if all bioenergy demand was to be covered only by slash and stumps. Only the Central part of Sweden presents a deficit that would be difficult to cover if not by importing from other countries or regions.*