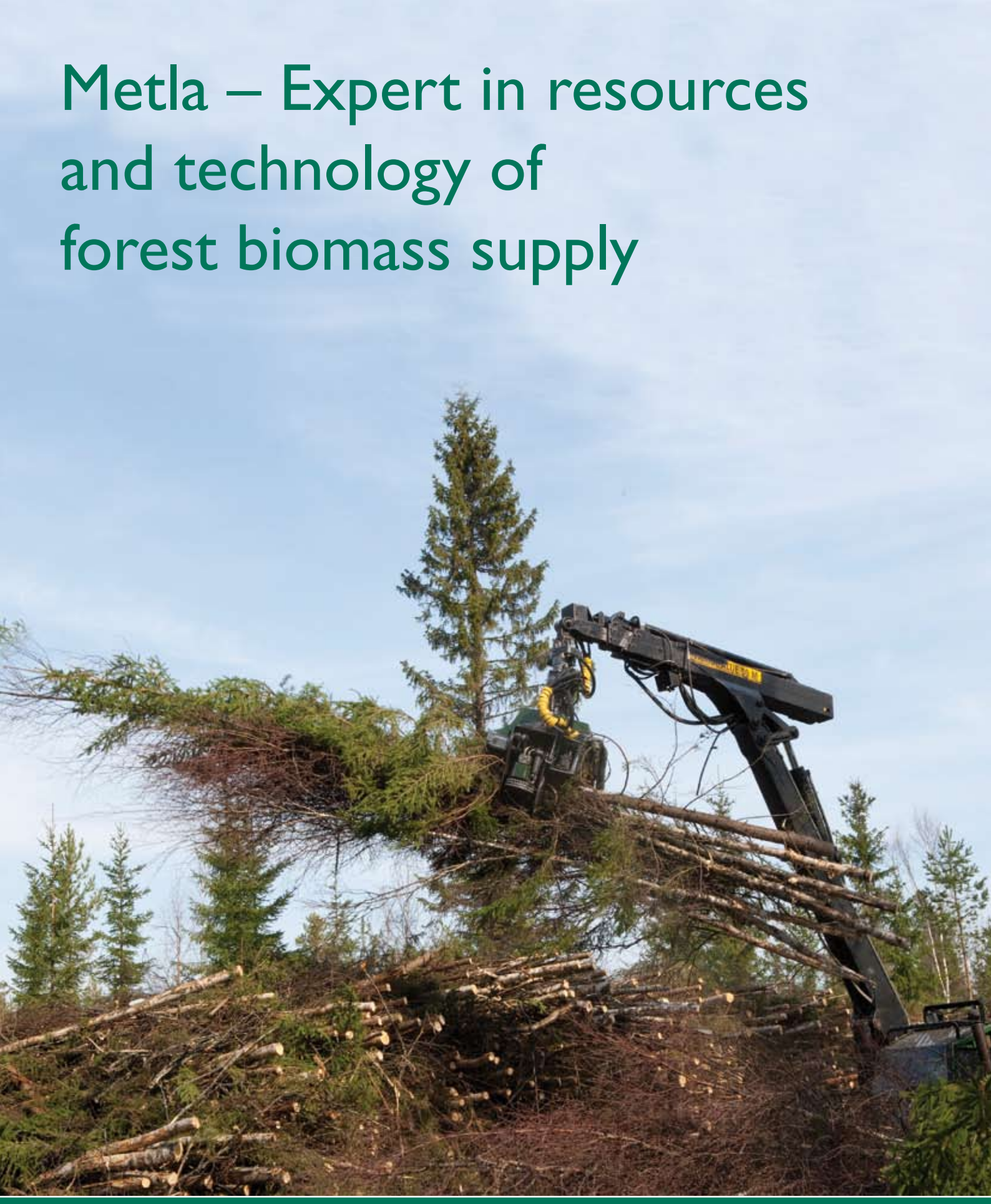
Metla – Expert in resources and technology of forest biomass supply



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Forerunner in the design of forest biomass supply chains for biorefineries

A. Forests as a source of bioenergy

Forests are the largest unutilized source of feedstock for biorefineries in the EU. The maximum potential for energy from forests in the EU 25 exceeds 500 million m^3 a year. About 30% of this potential (140 mill. m^3) could be harvested annually for energy. In Europe, 75% of residues in final fellings and 45% of thinnings could be harvested for energy, either by mechanised or manual cutting. However, there are large differences between countries and regions in the EU regarding the availability, quality and cost of the forest biomass.

Finland is the leading industrialized country in the use of forest biomass for energy: approximately 20% of its primary energy production is based on wood based fuels. The use of forest residual biomass for energy has been growing rapidly in the 2000's and has reached 3 mill. m^3 annually. The goal is to increase the use of forest biomass for energy purposes to 10 mill. m^3 by the year 2020.

The Finnish Forest Research Institute (Metla) has been studying and developing technology and logistics for the large scale supply of biomass for more than two decades. Although the biomass is readily available and there is proven power plant technology, research is essential in order to identify and mobilise the potential. Nowadays, secure and cost competitive supply of feedstock is the foremost constraint of bioenergy investments. More detailed, project specific, biomass resource and supply chain analysis (machines and logistics) are the key to success, and should be carried out across Europe.

B. Estimation of feedstock availability

The feedstock availability is an essential part of the investment decision in biomass based energy or fuel production. Our services start from GIS-based analysis of harvestable volumes of different biomass components such as harvesting residues, small diameter trees from thinnings and stump and root biomass. The estimation can be based on national forest inventory data and existing wood harvesting statistics. The more detailed studies rely on forest management plans and harvesting site data, in which each forest stand is located on the map and the available biomass for energy generation is estimated. In most cases the availability estimates are done at municipal level, which is sufficient for a pre-feasibility study of a bioenergy plant.

C. Selection of best technology for harvesting and transport

Metla and its partners have carried out applicability studies of biomass harvesting and transportation machinery in about ten European countries. The studies comprise of productivity studies and cost estimation of the harvested biomass. The harvested biomass, terrain condition as well as transportation infrastructure are considered in the technology selection. Nordic forest energy technology has often been found to be the most competitive solution. In particular, in countries where roundwood harvesting is mechanized biomass harvesting with fully mechanized systems seems to be the most cost efficient solution.

D. Long term feedstock availability and cost studies

Finally, the long term availability and costs of feedstock to biomass refineries or power plants are estimated. In this stage, the prognoses of forest growth in the region are used as the basic information. The feedstock resources are linked to specific plants which will be supplied with appropriate harvesting and transport systems. In this manner, the customer gets information about the availability of biomass over several decades.

Photos: Metla/Erkki Oksanen