

Contribution 174 in session "Forest roads and environment"

**Assessment of environmental performance and cost analysis of forest roads due to construction, maintenance and utilization – case studies in Romanian and Norwegian mountain forests**

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Keywords: forest roads, LCA, energy efficiency, forest operations

The new EU forest strategy (EC, 2013) advocates a holistic approach to the challenges of the entire forest value chain, focusing on the multifunctional potential of EU forests and on stimulating the use of forest resources in a way that minimizes the impact on the environment and climate for contributing to a better balance of carbon towards a green economy. In forests with poor accessibility, the environmental footprint of forest operations is significant due to long timber extraction distances. Improving the environmental performance of forest operations requires the improvement of forest infrastructure, specifically the density and quality of roads. Thus, the aim of this paper is to assess the environmental footprint of forest roads by quantifying the energy input, the loss of productive land, the greenhouse gas emissions, the manpower requirements and the costs from construction (i.e. preparatory works, embankments execution, drainage system and pavement), maintenance works (i.e. grading and compacting) and use of roads (i.e. annual timber traffic). Hence, comparative life cycle assessments of different types of high grade and low grade mountain forest roads from Romania and Norway will be conducted. Effective consumption rates of machine-hour, fuel, lubricants, raw materials and labour for each individual analysed case will be considered. The life span of the forest roads is 30 years. The energy embedded in raw materials directly used in construction works will be considered. The embedded energy in the machinery will be disregarded, only the consumed energy by the use of machinery being considered. The manpower requirements and the costs of these operations will be analysed. The outcomes of the study will be expressed per unit of road and unit of annual allowable cut of the forest area served by the roads.