



# Economics of biomass energy utilization in combustion and gasification plants: effects of logistic variables

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## Abstract

The substitution of conventional fossil fuels with biomass for energy production results both in a net reduction of greenhouse gases emissions and in the replacement of non-renewable energy sources. However, at present, generating energy from biomass is rather expensive due to both technological limits related to lower conversion efficiencies, and logistic constraints. In particular, the logistics of biomass fuel supply is likely to be complex owing to the intrinsic feedstock characteristics, such as the limited period of availability and the scattered geographical distribution over the territory. In this paper, the economical feasibility of biomass utilization for direct production of electric energy by means of combustion and gasification-conversion processes, has been investigated and evaluated over a capacity range from 5 to 50 MW, taking into account total capital investments, revenues from energy sale and total operating costs, also including a detailed evaluation of logistic costs. Moreover, in order to evaluate the impact of logistics on the bio-energy plants profitability, the effects of main logistic variables such as specific vehicle transport costs, vehicles capacity, specific purchased biomass costs and distribution density, have been examined. Finally, a mapping of logistic constraints on plant profitability in the specified capacity range has been carried out.

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## Keywords

Biomass energy; Combustion; Gasification; Economic analysis; Logistics.

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