Comprehensive Evaluation of the Introduction of Integrated Biomass Utilization System and Optimal Environmental Policies with Simulation Modeling Approach: Case study of Jilin Province, China

Tsukuba University SONG Junnian*
Tsukuba University HIGANO Yoshiro
Tsukuba University MIZUNOYA Takeshi

Jilin Province, located in the northeast of China, is an important industrial base and commodity grain base of China. Shortage of primary energy, low energy self-sufficiency rate and unreasonable energy structure are urgent problems for Jilin Province to solve. Besides, consumption of conventional fossil fuels has resulted in the exacerbation of global warming and air pollution. As a traditional agricultural province, there are a lot of advantages to support the biomass energy development in Jilin Province.

In this research an integrated biomass utilization system consisting of four sub-systems including biomass raw material production system, biomass supply system, biomass energy technological system and biomass energy consumption system will be established. Considering the material balance, energy balance and value balance, simulation modeling approach will be adopted as the evaluation method to make comprehensive evaluation of the environmental and economic effects of introducing the integrated biomass utilization system with the maximum GPR as the objective function. Finally it's expected to reach a decision regarding the optimal solution to the simultaneous pursuit of energy utilization, environmental preservation and economic development in study area and ultimately achieve the governmental planning goals.

Keywords: biomass energy, integrated system, biomass technologies, simulation model, GHGs