Economic Potential of Biomass from Unused Agriculture Land for Energy Use: Case of Croatia

In this paper the energy potential of biomass from growing short rotation coppice (SRC) on unused agricultural land in the Republic of Croatia was examined. At present, SRC is not completely recognized in Croatian legislative and considerations in energy strategy and action plans. The paper aspires to contribute to better understanding of the role SRC can take in national and local energy planning. The methodology is provided for regional analysis of biomass energy potential on unused agricultural land and for assessing the cost of the biomass at the power plant (PP) location considering transport distance, transport costs and size of the power plants up to 15 MWe, which was applied on the case of Croatian counties. Case studies have been analysed for optimal locations of such power plants depending on energy potential of SRC in various counties. Operation costs are also calculated for such power plants and appropriate size of seasonal heat storage is discussed for each case study. Case studies have shown the potential for use of previously unused agricultural land to help achieve national targets for renewable energy sources as well as reducing carbon dioxide emissions, help diversify the landscape and increase biodiversity. Through scenario approach, technical and energy potential of SRC is investigated and noticeable potential in Karlovac and Sisak-Moslavina Counties, due to large area of unused agricultural land in those counties. Energy potential of those counties is 2.2 PJ/year for Karlovac and 1.7 PJ/year for Sisak-Moslavina Country. With price of biomass at gate of power plant in best scenario reaching 44.7 €/t, novel systems of combined cooling, heating and power generation (CCHP) are not yet feasible, but SRC could be considered in already established central district heating systems.