

Feasibility study of different methods of energy extraction from Ardabil urban waste

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ABSTRACT:

In this research costs and revenues of each technology in economic and environmental scenarios are studied and in order to compare technologies economically, present net value method (the ratio of present net benefits to costs) in six scenarios are used. As a result, the highest revenues (by avoiding environmental cost related to electricity production of 115.72 dollar on tone and without avoided environmental cost related to electricity production 86.87) are related to anaerobic digestion technology and the highest present net value of benefits to costs in first scenario is related to the anaerobic digestion of 1.10 dollars on tone (without environmental costs, electricity revenues, fertilizer and CDM) and in the second scenario it is related to anaerobic digestion of 1.15 dollar on tone (without environmental cost and revenues from electricity, fertilizer and CDM sale) and in the third scenario it is related to anaerobic technology (with environmental cost and revenues from electricity sale). Municipal wastes are byproduct of social life which its correct management is one of the main concerns of urban and national authorities. On the other hand environmental problems caused by such practices such as greenhouse gas emission and production of pollutants have attracted the attention of International organizations and countries' authorities to waste management. Energy production from wastes is one of the selected solutions of urban managers in the area of sustainable management of wastes. In the fourth scenario it is related to anaerobic digestion of 1.4 dollars on tone with environmental costs and revenues from electricity, fertilizer and CDM and in the fifth scenario it is related to anaerobic digestion of 1.45 dollars on tone with environmental costs and revenues from electricity, fertilizer and CDM. Therefore the most economical technology of anaerobic digestion and gasification technology is type 1 and 2 of waste burning and waste landfill. With respect to environmental comparison of technologies using AHP method and expert choice software the most environmental technology is gasification. In order to combine economic and environmental factors we used the ratio of present net benefits to costs in six scenarios. The most economic and environmental technology is anaerobic digestion technology.

Keywords:

Energy extraction of waste, Landfill gas, Anaerobic digestion, Waste incinerator, Gasification.