

The Effect of Flue Gas Condensation on the Exergy Efficiency and Economic Performance of a Waste-To-Energy Plant

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Abstract : In this study, a waste-to-energy combined heat and power plant under construction was modelled and simulated with the Aspen Plus software. The base case process plant was evaluated and compared when integrated with flue gas condensation (FGC) in order to find out the impact of the exergy efficiency and economic feasibility as well as the effect of overall system exergy losses and revenue generated in the investigated plant. The economic evaluations were carried out using the vendor cost data from Aspen process economic analyser. The results indicate that 4 % increase in the exergy efficiency and 29 % reduction in the exergy loss in the flue gas were obtained when the flue gas condensation was incorporated. Furthermore, with the integrated FGC, the net present values (NPV) and income generated in the base process plant were increased by 29 % and 10 % respectively after 20 years of operation.

Keywords : economic feasibility, exergy efficiency, exergy losses, flue gas condensation, waste-to-energy

Conference Title : ICETSM 2019 : International Conference on Energy Technologies, Systems and Management

Conference Location : Toronto, Canada

Conference Dates : July 18-19, 2019