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MUNICIPAL SOLID WASTE SORTING AND TREATMENT SCHEMES FOR THE MAXIMIZATION OF MATERIAL AND ENERGY RECOVERY IN A LATEST EU MEMBER

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Abstract

This paper analyses mass and energy balances of some Integrated Municipal Solid Waste Systems (IMSWs) focusing on MSW sorting, treatment and energy recovery conversion chains suitable for the last entries into the European Union (EU). In particular the Romanian case-study has been developed as reference scenario. In this context the actions timelines for the case-study are immediate (S_{1A}), midterm (S_{1B}) and long term (S_2). In the scenarios S_{1A} , S_{1B} a poor selective collection (SC) is considered of 3.5% and 9.94% respectively from the total MSW stream. The Residual Municipal Solid Waste (RMSW) is always sent to a bio-drying process. Advanced mechanical sorting (AMS) treatments are applied in order to obtain Solid Recovered Fuel (SRF). A final industrial exploitation of SRF (S_{1A}) or a gasification option (S_{1B}) are considered as final treatments. Scenario S_2 includes a proficient SC implementation for paper and cardboard, plastics, glass, metals and wood, “Take back programs”, RMSW bio-drying, and SRF gasification. For the development of the calculations, one million tons of MSW were considered. The results show that the combination of proficient SC and „Take back programs” leads to a significant decrease in the annual waste disposal. Moreover the combustible material designated to energy recovery (S_{1A} cement factory, S_{1B} and S_2 gasification) decreases by weight (S_{1A} (53.7%), S_{1B} (55.84%) and S_2 (65.45%). In particular, without any pre-treatment (SC, Take back programs, mechanical sorting) of the RMSW stream by applying the its direct incineration, the Non Volatile Solids (NVS) landfill flow would be higher in comparison with all scenarios considered.

Key words: energy, integrated scenarios, municipal solid waste, solid recovery fuel

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