MASS AND ENERGY BALANCES FOR GASIFICATION OF PRIMARY SIEVED SOLIDS

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ABSTRACT

The poor performance of WasteWater Treatment Plants (WWTPs), due to excess loading is of major concern. Moreover, the high energy consumption of extended aeration plants and the management of biosolids are also significant issues of concern. Our laboratory is currently engaged on the use of a novel microsieving/microscreening device for the removal of solids upstream of the aeration tank for WWTPs which lack primary clarification. The removed Primary Sieved Solids (PSS) have high solids content (35-45%) and HHV (23.5-24.4 MJ/kg), and thus they are ideal for gasification. We are currently installing at the WWTP of Rethymno, Greece, a complete system (with capacity of about 5000 m^3/d of raw wastewater) for the separation of solids, followed by drying, gasification and production of electric energy through an internal combustion co-generation engine (Figure 1). The system utilizes the heat energy of the flue gas for drying the PSS. The overall energy balance is positive, however, due to the relatively small scale of the system the demand for parasitic energy consumption is expected relatively high, compared to a fullscale system.

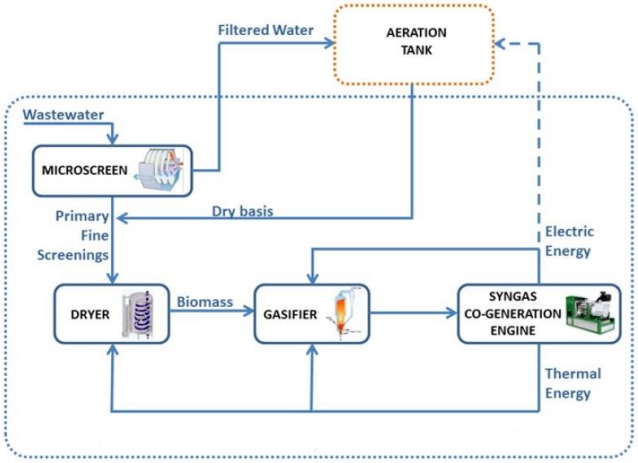

Figure 1. Flow diagram of the process

Apart from the exploitation of the energy content of the biosolids, it is expected a substantial increase of the performance of the WWTP and reduction of the energy requirements of the aeration tank, due to the upstream removal of suspended solids.

Keywords: *wastewater; microsieving; gasification; primary sieved solids; waste to energy.*

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