UTILIZATION OF PRIMARY SIEVED SOLIDS FOR GASIFICATION AND ENERGY PRODUCTION

A. MANALI*, P. GIKAS*

**Design of Environmental Processes Laboratory, School of Environmental Engineering, Technical University of Crete, 73100, Chania, Greece*

Primary sieved solids are solids removed from raw wastewater trough fine screening, using a microsieving device. Often, municipal WasteWater Treatment Plants (WWTPs) operate above the design loading rates, which results to the use of excess energy (for aeration) while there is a risk for environmental pollution. Upfront removal of solids can improve the efficiency of underperforming WWTPs. However, in most cases, the installation of primary clarifiers is no feasible, due to the space limitations. In such cases may be used microsieving devices, which are fine screening devices, producing biosolids (Primary Sieved Solids-PSS). PSS have high solids content (between 35-45%), of which about 85% are volatile, and significant calorific value (HHV about 24 MJ/kg). The relatively high solids content and high HHV of PSS make them ideal for gasification feedstock. Our lab is currently coordinating a research program for the improvement of the performance of the municipal WWTP of Rethymno, Greece, with utilization of the produced PSS for the production of electric energy, though syngas (the product of gasification) (Fig. 1). The wastewater flow rate of the pilot plan is 5000 m^3/d. The PSS will be further dried (to solids content of about 85%) using the thermal energy from the cogeneration engine. An overall positive energy balance is expected, however, the net energy production depends on the parasitic electric energy consumption for the pilot plant operation. Due to the relatively small size of the gasification system, the fraction of the parasitic energy consumption is expected higher than a full-scale plant.

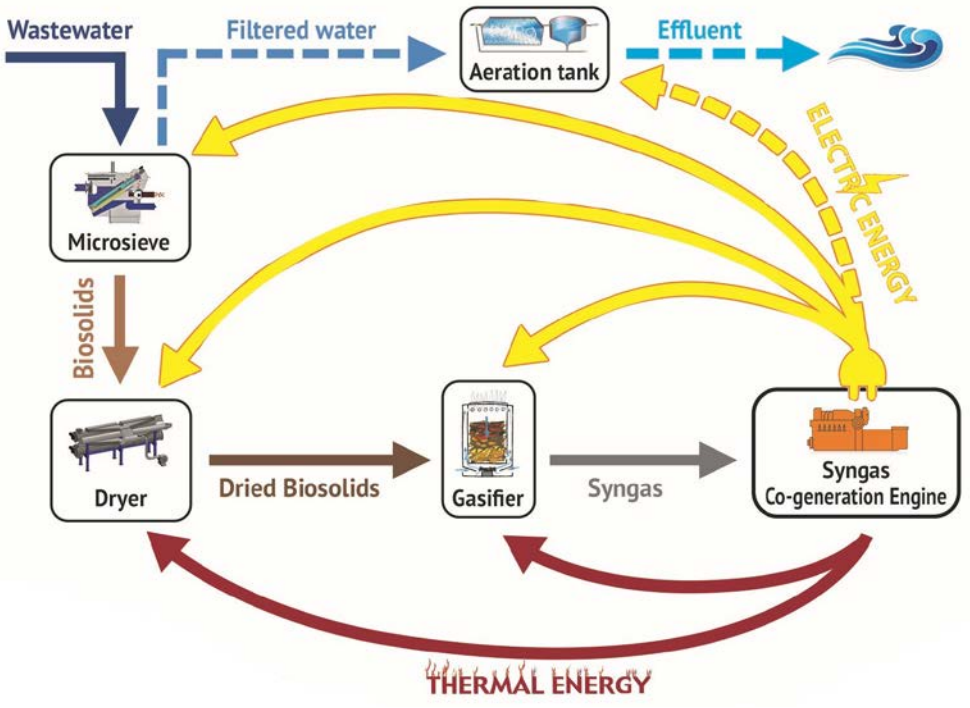

Figure 1. Flow diagram of the process

The system is expected to improve the performance of the WWTP with parallel management of biosolids production and with the production of excess electric energy. Dewatered biosolids produced from the aeration tank of the WWTP, will also be mixed with PSS and will be fed into the gasification system.

Keywords: WWTPs; gasification; biosolids management; primary sieved solids; waste to energy.

Acknowledgements: This study is supported by the LIFE project (European Commission): “New concept for energy self-sustainable wastewater treatment process and biosolids management (LIFE B2E4SustWWTP)”, LIFE16 ENV/GR/000298.