THERMAL AND ELECTRIC ENERGY PRODUCTION USING PRIMARY SIEVED SOLIDS FROM MUNICIPAL WASTEWATER, AS GASIFICATION FEEDSTOCK

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The high energy requirements of extended aeriation WasteWater Treatment Plants (WWTPs), due to the fact that all solids enter the aeration tank is a crucial issue, which result to high operational cost and inefficient performance of municipal WWTPs. A viable solution for the enhancement of WWTPs performance could be a process for the removal of biosolids upstream of the aeration tank using a rotating belt filter (microsieve), followed by drying, gasification and combustion of the produced syngas for the production of thermal and electric energy. Such a system is currently under installation at the WWTP of Rethymno, Greece. The system will have hydraulic capacity of 5000 m^3/d, which is about 1/3 of the inlet flowrate of the above WWTP. It is expected that ½-1 tone of biosolids will be produced every day. The produced Primary Sieved Solids (PSS) have a high solids content (35-45%) and gross calorific value of about 23 MJ/kg. The PSS will be further dried to 85% solids, prior to gasification. An internal combustion engine will be employed for the production of thermal and electric energy from syngas. The thermal energy will be conveyed to the dryer for the drying of the PSS, while the electric energy will partially cover the electrical needs of the WWTP. The net electric energy depends on the size of the plant, as the larger the plant, the smaller the fraction of the requirement for internal electric energy consumption. However, apart from energy production and the management of biosolids, the process has a positive effect to the performance of the WWTP, due to the reduction of the solids (and thus BOD) loading. This study is supported by the European Commission and the Green Fund, through the LIFE program: “New concept for energy self-sustainable wastewater treatment process and biosolids management (LIFE B2E4SustWWTP)”, LIFE16 ENV/GR/000298.

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