

## Optimized Renewable Energy Mix for Energy Saving in Waste Water Treatment Plants

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**Abstract :** This paper shortly describes three main actuations over a Waste Water Treatment Plant (WWTP) for reducing its energy consumption: Optimization of the biological reactor in the aeration stage by including new control algorithms and introducing new efficient equipment, the installation of an innovative hybrid system with zero Grid injection (formed by 100kW of PV energy and 5 kW of mini-wind energy generation) and an intelligent management system for load consumption and energy generation control in the most optimum way. This project called RENEWAT, involved in the European Commission call LIFE 2013, has the main objective of reducing the energy consumptions through different actions on the processes which take place in a WWTP and introducing renewable energies on these treatment plants, with the purpose of promoting the usage of treated waste water for irrigation and decreasing the CO<sub>2</sub> gas emissions. WWTP is always required before waste water can be reused for irrigation or discharged in water bodies. However, the energetic demand of the treatment process is high enough for making the price of treated water to exceed the one for drinkable water. This makes any policy very difficult to encourage the re-use of treated water, with a great impact on the water cycle, particularly in those areas suffering hydric stress or deficiency. The cost of treating waste water involves another climate-change related burden: the energy necessary for the process is obtained mainly from the electric network, which is, in most of the cases in Europe, energy obtained from the burning of fossil fuels. The innovative part of this project is based on the implementation, adaptation and integration of solutions for this problem, together with a new concept of the integration of energy input and operative energy demand. Moreover, there is an important qualitative jump between the technologies used and the alleged technologies to use in the project which give it an innovative character, due to the fact that there are no similar previous experiences of a WWTP including an intelligent discrimination of energy sources, integrating renewable ones (PV and Wind) and the grid.

**Keywords :** aeration system, biological reactor, CO<sub>2</sub> emissions, energy efficiency, hybrid systems, LIFE 2013 call, process optimization, renewable energy sources, wasted water treatment plants

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