



## Diagnostic of electricity consumption, its cost and greenhouse gas emission in the wastewater treatment sector of Algeria

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### ABSTRACT

Wastewater treatment sector, in Algeria, uses exclusively two processes: the activated sludge applied in the north and the lagooning in the highlands and the south. In the operating balance of the National Sanitation Office (ONA), the activated sludge wastewater treatment plants are characterized by a high electricity consumption which induced high cost and greenhouse gas (GHG) emission. In 2010, about 104.32 million m<sup>3</sup> of wastewater was treated. This operation consumed 30,900 MWh of electricity which cost 1.04 million Euros (€) and emitted 18,761 tons of CO<sub>2</sub>-equivalent. In 2013, the treated wastewater increased by 35.2% and the electricity consumption by 45.8%. To establish an exhaustive diagnostic, this study evaluated the electricity consumed during 2009/2010 in an activated sludge wastewater treatment plant of 70,000 population equivalents (PE) (i.e. Unit of a pollution load produced daily per person, fixed at 60 grams of DBO<sub>5</sub>, which is used for the sizing of the wastewater treatment plants). Three areas were investigated: (1) the treatment process which consumed 89.63% of electricity; (2) the management department and the laboratory with 4.60%; and (3) the outdoor lighting with 5.77%. The biological treatment was the intensive-energy part of the treatment which consumed 70.05% of electricity. The aim of this diagnostic was to evaluate the performance level of the activated sludge wastewater treatment process relatively to the energy, financial and environmental factors in order to optimize the process and, then, to evaluate the benefit that could be provided by the integration of renewable energy in a sustainable wastewater treatment context.

*Keywords:* Algerian wastewater treatment sector; Activated sludge process; Electricity consumption; Electricity cost; Greenhouse gas emission

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