

EVALUATION OF ANNUAL EQUIVALENT COSTS OF THE WASTEWATER TREATMENT PLANTS OF THE MUNICIPALITIES OF CLIZA AND TOLATA

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ABSTRACT

The main objective of this study is to analyze all the costs involved when implementing a domestic Wastewater Treatment Plant (WWTP) in the municipalities of Cliza and Tolata, in the region of the Valle Alto in Cochabamba - Bolivia. This study uses the methodology known as Annual Equivalent Cost of sanitation systems in order to determine not only initial investment costs, but also all recurring costs related to operation and maintenance. The WWTP of Cliza and Tolata serve 10000 and 3200 inhabitants respectively. The total investment cost of WWTP of Cliza is 533,950 USD. The Annual Equivalent Cost of this plant using a 5% discount rate is 60,591 USD/year. Out of this amount, 68% (41,179 USD/year) corresponds to the Capital Expenditure (CAPEX) and 32 % (19,412 USD) to the Operational Expenditure (OPEX). The total cost per capita is 6,06 USD per year and the cost per cubic meter of treated water is 0,29 USD. The total cost of the WWTP at Tolata is 254,524 USD. The Annual Equivalent cost of this plant using 5% discount rate is 51,541 USD/year. Out of this amount, 66% (34,048 USD/year) corresponds to CAPEX and 34 % (17,493 USD) to OPEX respectively. The total cost per capita is 16.11 USD/year USD and the cost per cubic meter of treated water is 0.40 USD. It is clear that Operation and Maintenance (O&M) costs are significant, and this confirms the relevance to develop financial strategies to guarantee the sustainability of the service provision in the long run. Particularly, the Upflow Anaerobic Sludge Bed reactor (UASB) technology of these plants has low energy consumption and the OPEX costs are lower than other conventional technologies. We do recommend using the Annual Equivalent Cost described in this study in order to make fair comparisons between the technologies and, ultimately, to make better decisions in the planning and implementation of future treatment systems.

Keywords: Annual Equivalent Cost, OPEX, CAPEX, Cliza, Tolata, WWTP.

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