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WASTEWATER AND BIOGAS PRODUCTION IN KATHMANDU VALLEY, NEPAL: CHALLENGES AND OPPORTUNITIES

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Abstract

Kathmandu valley, the country’s most urbanized city, is expected to deal with an estimated 200 million liters per day (MLD) of wastewater at the completion of the Melamchi Water Supply Project. In this paper, we review the history, present, and future prospects of the wastewater treatment plant (WWTPs) as well as estimate the total biogas potential of the expected wastewater through anaerobic digestion using the chemical oxygen demand (COD) mass balance approach. The total biogas potential from the expected 200 MLD wastewater with an average COD concentration of 1000 ± 225 mg/L, was estimated to be $23105\pm5185\text{Nm}^3/\text{day}$ which is equivalent to a total electricity potential of 3.35 ± 0.76 megawatt (MW). Thus, produced bioenergy can be utilized to supply the energy demand of the treatment plants, support the plants to be less dependent on the grid energy—thereby helping to achieve energy self-sufficiency, achieve cleaner urban rivers, and possibly also reduce greenhouse gas emissions from the plants. This study also encourages timely construction and completion of energy self-sufficient treatment plants around the country.

Keywords: bioenergy; biogas; chemical oxygen demand (COD); Kathmandu Valley; wastewater

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