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**Energy Management in Wastewater Treatment Plants:
Optimization of Energy Production**

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Energy management in wastewater treatment plants includes methane production, optimization and utilization in the form of biogas from anaerobic digestion process. The research being conducted in the Chemical and Environmental Engineering Department at the Illinois Institute of Technology involves energy production analysis at the largest wastewater treatment plant in the world, Stickney Water Reclamation Plant in Chicago, as the model. The plant has a design capacity of 1200 million gallons wastewater per day and serves approximately 12 million population equivalent. The main focus of the work is on biogas potential of domestic municipal wastewater, specifically methane content and track changes in the biogas potential as the wastewater and sludge produced pass through different treatment units of the plant. The task is done to determine BOD, COD, TSS, VS, COD-Equivalent values of the liquid and solid waste streams at the lowest and highest raw wastewater temperature ranges during the year and then convert them into CH₄ potential using chemical stoichiometric equations. The results are compiled into a spread sheet-based model to determine mass balance in terms of organic carbon for the plant. The output CH₄ production prediction is compared with the actual biogas production at the plant following which strategies to implement the model in the plant and optimize gas production can be developed.

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