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Special Issue Reprint

Advances in Wastewater Treatment 2024

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The following Reprint, based on the Special Issue “Advances in Wastewater Treatment 2024”, compiles 12 papers (one Editorial, five review papers, and six original scientific papers) on innovative pollutant-removal technologies aimed at harnessing renewable energy from wastewater. Several papers included in this Special Issue address energy efficiency: the authors of one study assess the economic feasibility of a hydropower plant at the Toruń (Poland) treatment facility, while the authors of another study analyze energy use across three plants in southwestern Poland to propose strategies for reducing energy consumption and carbon footprint. In another study, the authors evaluate a novel Venturi-assisted confined tube aerator designed to lower aeration energy demand. The focus of three of the included papers is contaminant removal: synthesis and testing of Zn/Al layered double hydroxides for Congo red dye removal; assessment of low direct-current densities for phosphorus, nitrogen, and organic-compound removal in a sequential electrochemical reactor treating greenhouse wastewater; and evaluation of biochars and activated carbon for removing heavy metals from wastewater generated during soil remediation. The five review papers focus on renewable-energy integration for energy-self-sufficient municipal plants; advances in chemical coagulation and electrocoagulation; methanogenesis for biomethane production; solar-driven photocatalytic treatment using concentrator systems; and modeling and management strategies to optimize aeration energy use.

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