

Innovative Wastewater Treatment & Resource Recovery Technologies: Impacts on Energy, Economy and Environment

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This book introduces the 3R concept applied to wastewater treatment and resource recovery under a double perspective.

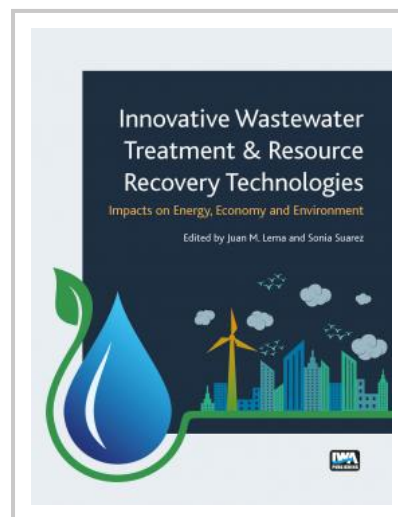
Firstly, it deals with **innovative technologies** leading to:

Reducing energy requirements, space and impacts; **Reusing** water and sludge of sufficient quality; and **Recovering** resources such as energy, nutrients, metals and chemicals, including biopolymers. Besides targeting effective C,N&P removal, other issues such as organic micropollutants, gases and odours emissions are considered. Most of the technologies analysed have been tested at pilot- or at full-scale. Tools and methods for their Economic, Environmental, Legal and Social impact assessment are described.

The 3R concept is also applied to **Innovative Processes** design, considering different levels of innovation: **Retrofitting**, where novel units are included in more conventional processes; **Re-Thinking**, which implies a substantial flowsheet modification; and **Re-Imagining**, with completely new conceptions. Tools are presented for Modelling, Optimising and Selecting the most suitable plant layout for each particular scenario from a holistic technical, economic and environmental point of view.

Contents:

Nutrient removal; Anaerobic Treatment of Municipal Wastewater; Resource recovery from source separated domestic wastewater: energy, water, nutrients and organics; Wastewater treatment in algal systems; Niches for Bioelectrochemical systems in sewage treatment plants; Aerobic granular sludge reactors; Membranes in wastewater treatment; Enhanced Primary Treatment; Innovative primary and secondary sewage treatment technologies for organic micropollutants abatement; Post-treatment for micropollutants removal; Technologies limiting gas and odour emissions; Reducing the impact of sludge; Producing high-quality recycled water; Producing sludge for agricultural applications; Recovering energy from sludge; Metal recovery from sludge: Problem or Opportunity; Nutrients recovery from wastewater streams; Recovery of organic added value products from wastewater; The impact of innovation on wastewater treatment economics; Assessing environmental impacts and benefits of wastewater treatment plants; Determining benchmarks in wastewater treatment plants using Life Cycle Assessment; Public perceptions of recycled water; Greenhouse and Odour emissions; The impact and risks of micropollutants in the environment; Legal and Policy Frameworks for the Management of Wastewater; Environmental decision support systems; Superstructure-based optimization tool for plant design and retrofitting; Model-based comparative assessment of innovative processes



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