

Resource Recovery from Water: Principles and Application

Resource Recovery from Water: Principles and Application

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Published by

IWA Publishing
Unit 104–105, Export Building
1 Clove Crescent
London E14 2BA, UK
Telephone: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
Email: publications@iwap.co.uk
Web: www.iwapublishing.com

First published 2022
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British Library Cataloguing in Publication Data

A CIP catalogue record for this book is available from the British Library

ISBN: 9781789060317 (Paperback)

ISBN: 9781780409566 (eBook)

ISBN: 9781780409573 (ePUB)

This eBook was made Open Access in February 2022

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Foreword

The water sector provides vital services to society that are essential for human health, sustaining economies, and protecting the environment. These roles will remain, but there are important changes underway that are calling for a new, changed paradigm for the way water is viewed and managed. With increasing global change pressures, cities of the future will experience difficulties in efficiently managing scarcer and less reliable water resources. In order to meet these challenges, there is a need for a fundamental change in the way we use and reuse water, based on a foundation of research, technology and innovation.

Climate change demands mitigation efforts to reduce greenhouse gas emissions. We live in a resource-constrained world in which the global population is expected to grow by another few billion. Such factors drive us towards a shift from a traditional approach to wastewater treatment to one aligned with a new paradigm in which the used water and materials and energy within it represent opportunities for resource recovery. The same applies for drinking water treatment, where the residuals from this treatment are often wasted. Minimising the movement of water, maximising reuse and redefining 'waste' as a resource can optimise productive use (matching quality to intended use) and reduce pollution. Sustainable (waste-) water management through resource recovery and reuse can be achieved with integrated business models that go beyond standard services and transform waste into valuable resources such as biofuels and fertiliser while also improving water management.

To make progress in this paradigm shift, there is a need to clarify underlying principles and to gather experiences of their application. This book contributes on both fronts, signalling opportunities in the water sector, industry, agriculture and the energy sector, in particular. These are opportunities that can be economically viable, with the prospect that further technological advances, growth in 'green' demand, and greater cost and scarcity of raw materials will add to that viability.

The water sector is poised to be able to help transform society. The relative predictability of potable water and wastewater flows through its infrastructure add to the sector's attractiveness as a partner in this transformation. Similarly, the relative long life of this infrastructure can provide a stable core around which implementation of resource recovery can be built.

However, because of this long life, change is needed now. Technology breakthroughs and innovative designs need to be coupled with comprehensive system changes to urban water processes, institutions, and regulations. We need to recognise the high-level relationships among water resources, energy, and land use in an urbanising world. More is needed than simply improving the performance and

efficiency of the component parts of systems – change is needed at a system-wide level as well. This new book will help shape the actions that will be needed. It also points to the vibrant future we can expect in the sector – a vibrancy that stands to attract and inspire the next generation of young water professionals.

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