

Resource Recovery from Water: Principles and Application

Resource Recovery from Water: Principles and Application

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Contents

| | |
|---------------|------|
| Foreword..... | xvii |
|---------------|------|

Chapter 1

| | |
|--|----------|
| <i>Resource recovery from municipal wastewater: what and how much is there?.....</i> | 1 |
| <i>Pieter Ostermeyer, Gabriel Capson-Tojo, Tim Hülsen, Gilda Carvalho, Adrian Oehmen, Korneel Rabaey and Ilje Pikaar</i> | |

| | | |
|-------|--|----|
| 1.1 | Introduction..... | 1 |
| 1.2 | Learning Objectives..... | 2 |
| 1.3 | How Do We Define Wastewater?..... | 2 |
| 1.4 | How Much Municipal Wastewater is Produced?..... | 2 |
| 1.5 | How is Municipal Wastewater Collected?..... | 2 |
| 1.6 | Untreated Municipal Wastewater – What Resources are in There and in What Concentration Range?..... | 3 |
| 1.7 | What Resources Can be Recovered During Treatment of Municipal Wastewater?..... | 5 |
| 1.7.1 | Water reuse..... | 6 |
| 1.7.2 | Inerts..... | 8 |
| 1.7.3 | Organic matter..... | 8 |
| 1.7.4 | Energy from wastewater..... | 9 |
| 1.7.5 | Nitrogen..... | 10 |
| 1.7.6 | Phosphorus..... | 10 |
| 1.7.7 | Heavy metals..... | 10 |
| 1.7.8 | Coagulants..... | 11 |
| 1.8 | Chapter Summary..... | 12 |
| 1.9 | Exercises..... | 12 |
| 1.10 | Discussion Questions..... | 15 |
| | Further Reading Materials..... | 17 |
| | References..... | 17 |

Chapter 2***Resource recovery from industrial wastewater: what and how much is there?*** 21*Eric Walling, Wim Moerman, Willy Verstraete, Denys K. Villa Gomez and C line Vaneeckhaute*

| | | |
|-------|--|----|
| 2.1 | Introduction | 21 |
| 2.2 | Learning Objectives | 22 |
| 2.3 | The Major Industries that Produce Wastewater and their Characteristics | 23 |
| 2.3.1 | Food and beverage industries | 28 |
| 2.3.2 | Textile industries and leather production | 29 |
| 2.3.3 | Wood-related industries | 30 |
| 2.3.4 | Metal and mining industries | 32 |
| 2.3.5 | Oil and gas production and refining | 33 |
| 2.3.6 | Chemical industry | 33 |
| 2.4 | Current Practice in Industrial Wastewater Treatment | 34 |
| 2.5 | Which Resources can be Recovered from Industrial Wastewater Treatment? | 36 |
| 2.5.1 | Nutrients | 38 |
| 2.5.2 | Metals | 39 |
| 2.5.3 | Chemical compounds | 39 |
| 2.5.4 | Stabilized organic biosolids | 40 |
| 2.5.5 | Water | 40 |
| 2.5.6 | Energy | 41 |
| 2.5.7 | Symbiotic resource recovery | 41 |
| 2.6 | Chapter Summary | 42 |
| 2.7 | Exercises | 42 |
| 2.8 | Discussion Questions | 44 |
| | References | 45 |

Chapter 3***Resource recovery from drinking water production facilities: what and how much is there?*** 49*Ilje Pikaar, Katrin Doederer, Tessa van den Brand, Olaf van der Kolk and Wolfgang Gernjak*

| | | |
|-------|--|----|
| 3.1 | Introduction | 49 |
| 3.2 | Learning Objectives | 50 |
| 3.3 | Major Sources for the Production of Drinking Water | 50 |
| 3.4 | Current Practice in Water Treatment | 51 |
| 3.4.1 | Coagulation-flocculation-sedimentation | 52 |
| 3.4.2 | Lime-soda ash softening | 52 |
| 3.4.3 | Ion exchange | 52 |
| 3.4.4 | Membrane filtration | 52 |
| 3.5 | Which Resources Can Be Recovered? | 53 |
| 3.6 | Chapter Summary | 56 |
| 3.7 | Exercises | 57 |
| 3.8 | Discussion Questions | 58 |

| | |
|---------------------------------|----|
| Further Reading Materials | 59 |
| References | 59 |

Chapter 4

| | |
|--|-----------|
| <i>Water reuse: a pillar of the circular water economy</i> | 61 |
| <i>Valentina Lazarova</i> | <i>61</i> |
| 4.1 Introduction | 61 |
| 4.2 Learning Objectives | 62 |
| 4.3 Water Reuse as a Key Pillar of the Circular (Water) Economy | 62 |
| 4.4 Water Reuse Planning | 64 |
| 4.4.1 Key water reuse drivers | 65 |
| 4.4.2 Key water reuse challenges | 65 |
| 4.5 Water Reuse Applications | 67 |
| 4.6 Water Reuse Treatment and Design | 71 |
| 4.6.1 Typical treatment trains for agricultural and landscape irrigation | 73 |
| 4.6.2 Typical treatment trains for urban reuse | 73 |
| 4.6.3 Typical treatment schemes for potable reuse | 74 |
| 4.6.4 Typical process design | 74 |
| 4.7 Key Characteristics and Milestones of Agricultural Water Reuse | 76 |
| 4.7.1 Water quality requirements | 78 |
| 4.7.2 Health risk management | 78 |
| 4.7.3 Major findings and lessons learned | 78 |
| 4.8 Key Characteristics and Milestones of Urban Water Reuse | 78 |
| 4.8.1 Landscape irrigation | 79 |
| 4.8.2 Other urban uses | 79 |
| 4.8.3 Main steps and milestones in the development of urban reuse | 79 |
| 4.8.4 Major findings and lessons learned | 81 |
| 4.9 Key Characteristics and Milestones of Industrial Water Reuse | 81 |
| 4.9.1 Water quality requirements | 82 |
| 4.9.2 Management of adverse water quality impacts | 82 |
| 4.9.3 Milestones in industrial reuse | 82 |
| 4.9.4 Major findings and lessons learned | 83 |
| 4.10 Key Characteristics and Milestones of Potable Water Reuse | 84 |
| 4.10.1 Key points in development of potable reuse | 84 |
| 4.10.2 Milestones in potable water reuse | 84 |
| 4.10.3 Major findings and lessons learned | 86 |
| 4.11 The Cost-Risk Nexus | 86 |
| 4.12 Innovation and Research Needs | 87 |
| 4.13 Chapter Summary | 88 |
| 4.14 Exercises | 88 |
| 4.14.1 Multiple choice test | 88 |
| 4.15 Discussion Questions | 94 |
| 4.15.1 Planning and evaluation of the feasibility of water reuse | 94 |
| 4.15.2 Water reuse technologies | 94 |
| 4.15.3 Water reuse applications | 95 |
| Further Reading Materials | 95 |
| References | 95 |

Chapter 5***Established full-scale applications for energy recovery from water: anaerobic digestion* 99**

*Paul D. Jensen, Sergi Astals, Xue Bai, Ludwika Nieradzik, Peter Wardrop,
Damien J. Batstone and William P. Clarke*

| | |
|---|-----|
| Glossary | 99 |
| 5.1 Introduction | 100 |
| 5.2 Learning Objectives | 101 |
| 5.3 Conceptual Overview of Energy Recovery through Anaerobic Digestion | 101 |
| 5.3.1 Fundamental principles of anaerobic digestion | 101 |
| 5.3.2 Characterizing feedstock and methane potential | 102 |
| 5.3.3 Overview of anaerobic digestion technologies | 106 |
| 5.3.4 Design and operation of anaerobic digestion technologies | 113 |
| 5.4 Case Studies and Implementation | 125 |
| 5.4.1 Case study 1: anaerobic digestion of agricultural wastewater | 125 |
| 5.4.2 Case study 2: high-rate anaerobic digestion in the food and beverage industry | 127 |
| 5.4.3 Case study 3: anaerobic digestion of municipal wastewater sludge | 128 |
| 5.5 Challenges, Opportunities and Research Needs | 129 |
| 5.6 Summary | 131 |
| 5.7 Exercises | 132 |
| 5.8 Discussion Questions | 136 |
| Further Reading Materials | 137 |
| References | 137 |

Chapter 6***Upgrading anaerobic digestion within the energy economy – the methane platform* 141**

*Largus T. Angenent, Joseph G. Usack, Tianran Sun, Christian Fink, Bastian Molitor,
Rodrigo Labatut, Roy Posmanik, Manuel Hörl and Doris Hafenbradl*

| | |
|--|-----|
| 6.1 Introduction | 141 |
| 6.2 Learning Objectives | 142 |
| 6.3 What Drives Methane and Carbon Dioxide Yields in Anaerobic Digestion | 143 |
| 6.3.1 Thermodynamic reason for high methane yields – extreme fermentation | 143 |
| 6.3.2 Why carbon dioxide is produced besides methane – electron balance | 144 |
| 6.3.3 How to improve methane yields with biology – thermophilic AD | 144 |
| 6.4 How to Improve Methane Yields or Produce Other Energy-Carriers with Hydrothermal Systems | 145 |
| 6.4.1 What are hydrothermal systems? | 145 |
| 6.4.2 Thermal hydrolysis (TH) as a pre-treatment to AD | 146 |
| 6.4.3 Hydrothermal liquefaction (HTL) as a pre- or post-treatment for AD | 146 |
| 6.5 Removing Carbon Dioxide from Biogas | 147 |
| 6.5.1 The basic principle of carbon dioxide separation | 147 |
| 6.5.2 Physical and chemical absorption | 147 |
| 6.5.3 Physical absorption of carbon dioxide using water scrubbing | 147 |
| 6.5.4 Chemical absorption of carbon dioxide using amines | 148 |
| 6.5.5 Adsorption | 149 |
| 6.5.6 Biogas upgrading using pressure-swing adsorption | 149 |
| 6.6 Ex-Situ Biomethanation | 150 |
| 6.6.1 PtG concept | 150 |

| | | |
|-------|---|-----|
| 6.6.2 | Hydrogen supply via electrolysis | 150 |
| 6.6.3 | Bioreactor technology | 152 |
| 6.6.4 | Why operate at 65°C rather than 37°C | 153 |
| 6.6.5 | Thermophilic methanogen – <i>Methanothermobacter thermautotrophicus</i> | 153 |
| 6.7 | Perspectives and Future Needs | 154 |
| 6.8 | Chapter Summary | 155 |
| 6.9 | Exercises | 155 |
| 6.10 | Discussion Questions | 156 |
| | Further Reading Materials | 156 |
| | References | 157 |

Chapter 7

Anaerobic fermentation technologies for the production of chemical building blocks and bio-based products from wastewater 159

Pieter Candry, José Maria Carvajal-Arroyo, Steven Pratt, João Sousa, Çağrı Akyol, Francesco Fatone and Ramon Ganigué

| | | |
|-------|---|-----|
| 7.1 | Introduction | 159 |
| 7.2 | Learning Objectives | 160 |
| 7.3 | Microbiology and Biochemistry of Carboxylic Acid Production | 160 |
| 7.3.1 | Hydrolysis | 161 |
| 7.3.2 | Primary fermentations | 163 |
| 7.3.3 | Secondary anaerobic conversions | 166 |
| 7.3.4 | The reason behind it all: energy maximization and redox balancing | 169 |
| 7.4 | Chemical and Biological Downstream/Upgrading Routes for the Recovery of Carboxylic Acids | 170 |
| 7.4.1 | Solid–liquid separation before product recovery | 170 |
| 7.4.2 | Physicochemical product upgrading | 171 |
| 7.4.3 | Biological product upgrading | 175 |
| 7.5 | Conceptual Overview of the Production of Short-Chain Carboxylic Acids (SCCA) from Wastewater | 176 |
| 7.5.1 | Technological principles | 176 |
| 7.5.2 | Fundamental principles | 177 |
| 7.5.3 | Applications | 177 |
| 7.5.4 | Case studies | 178 |
| 7.6 | Conceptual Overview of the Production of Medium-Chain Carboxylic Acids (MCCA) from Wastewater | 180 |
| 7.6.1 | Technological principles | 180 |
| 7.6.2 | Fundamental principles | 181 |
| 7.6.3 | Applications | 181 |
| 7.6.4 | Case studies | 182 |
| 7.7 | Challenges, Opportunities and Research Needs | 183 |
| 7.7.1 | Bioprocess engineering | 183 |
| 7.7.2 | SCCA/MCCA product recovery | 184 |
| 7.7.3 | From lab to real life | 185 |
| 7.8 | Chapter Summary | 185 |
| 7.9 | Exercises | 186 |
| 7.10 | Discussion Questions | 187 |
| | References | 188 |

Chapter 8***Upscaled and validated technologies for the production of bio-based materials from wastewater*** **197**

Çağrı Akyol, E. Gozde Ozbayram, Anna Laura Eusebi, Alessia Foglia, Giulia Cipolletta, Nicola Frison, Vincenzo Conca, Cinzia Da Ros, Coos Wessels, Ramon Ganigué, Ilje Pikaar, Adrian Oehmen, Gilda Carvalho and Francesco Fatone

| | | |
|-----|---|-----|
| 8.1 | Introduction | 197 |
| 8.2 | Learning Objectives | 198 |
| 8.3 | Conceptual Overview of Cellulose Recovery from Municipal Wastewater | 198 |
| | 8.3.1 Fundamental principles. | 199 |
| | 8.3.2 Applications and design | 199 |
| | 8.3.3 Successful case studies of implementation | 201 |
| 8.4 | Conceptual Overview of Polyhydroxyalkanoates (PHA) Production | 204 |
| | 8.4.1 Fundamental principles. | 204 |
| | 8.4.2 Applications and design | 206 |
| | 8.4.3 Case studies | 208 |
| 8.5 | Challenges, Opportunities, and Research Needs. | 212 |
| | 8.5.1 Cellulose | 212 |
| | 8.5.2 PHA. | 213 |
| 8.6 | Chapter Summary | 213 |
| 8.7 | Exercises | 214 |
| 8.8 | Discussion Questions | 217 |
| | Further Reading Materials | 218 |
| | References. | 218 |

Chapter 9***Producing microbial-based protein from reactive nitrogen recovered from wastewater*** **223**

Ilje Pikaar, Heidy Cruz, Tim Hülsen, Damien Batstone, Korneel Rabaey, Paul Jensen, Yoram Avnimelech and Willy Verstraete

| | | |
|-----|--|-----|
| 9.1 | Introduction | 223 |
| 9.2 | Learning Objectives | 224 |
| 9.3 | Conceptual Overview Production of Microbial Protein Using Recovered Nitrogen | 224 |
| | 9.3.1 Fundamental principles of the microbial conversion. | 224 |
| | 9.3.2 Application and design | 229 |
| | 9.3.3 Direct assimilation of recovered nitrogen into microbial biomass | 231 |
| | 9.3.4 Case studies and implementation. | 232 |
| 9.4 | Challenges, Opportunities and Research Needs | 235 |
| | 9.4.1 The microbial production step | 236 |
| | 9.4.2 The harvesting of the microbial produced microbial cells | 236 |
| | 9.4.3 Economic and environmental competitiveness | 237 |
| 9.5 | Chapter Summary | 237 |
| 9.6 | Exercises | 238 |
| 9.7 | Discussion Questions | 240 |
| | Further Reading | 241 |
| | References. | 242 |

Chapter 10***Nutrient recovery from water and wastewater* 245**

Robert Colston, Stephan Tait, Céline Vaneekhaute, Heidy Cruz, Ilje Pikaar, Thomas Seviour, Johannes B. M. Klok, Jan Weijma, Henk Dijkman, Cees J. N. Buisman, Sasha Scattergood, Ana A. Robles-Aguilar, Erik Meers, Fabrice Béline and Ana Soares

| | | |
|--------|--|-----|
| 10.1 | Introduction | 245 |
| 10.2 | Learning Objectives | 246 |
| 10.3 | Phosphorus Recovery – the Essential and Dwindling Nutrient | 246 |
| 10.3.1 | Conceptual overview – struvite precipitation | 247 |
| 10.3.2 | Struvite precipitation – applications and design | 258 |
| 10.3.3 | Struvite precipitation – case studies of full scale implementation | 266 |
| 10.3.4 | Struvite precipitation – challenges, opportunities and research needs | 269 |
| 10.4 | Nitrogen Recovery by Ammonia Stripping and Absorption | 271 |
| 10.4.1 | Conceptual overview – ammonia stripping and absorption | 272 |
| 10.4.2 | Ammonia stripping and absorption – applications and design | 275 |
| 10.4.3 | Liquid-filled diffused gas-sparged systems | 278 |
| 10.4.4 | Ammonia stripping and absorption – case studies of implementation | 278 |
| 10.4.5 | Ammonia stripping and absorption – challenges, opportunities, and research needs | 281 |
| 10.5 | Sulfur Recovery | 281 |
| 10.5.1 | Conceptual overview | 282 |
| 10.5.2 | Fundamental principles | 282 |
| 10.5.3 | Applications and design | 283 |
| 10.5.4 | Case studies of implementation | 285 |
| 10.5.5 | Challenges, opportunities and research needs | 286 |
| 10.6 | Chapter Summary | 288 |
| 10.7 | Exercises | 288 |
| 10.8 | Discussion Questions | 289 |
| | Acknowledgements | 289 |
| | References | 290 |

Chapter 11***Established technologies for metal recovery from industrial wastewater streams* 295**

Jan Weijma, Johannes B.M. Klok, Henk Dijkman, Gijs Jansen, Irene Sánchez-Andrea, Cees J.N. Buisman, Eric D. van Hullebusch, Tom Henebel, Gijs du Laing, Heidy Cruz, Ilje Pikaar and Denys K. Villa Gomez

| | | |
|--------|---|-----|
| 11.1 | Introduction | 295 |
| 11.2 | Learning Objectives | 296 |
| 11.3 | Conceptual Overview of Sulfide-Based Methods for Metal Recovery from Wastewater | 297 |
| 11.4 | Fundamental Principles of Metal Sulfide Precipitation | 297 |
| 11.4.1 | Precipitation reactions and solubility products | 297 |
| 11.4.2 | Nucleation and crystallization | 298 |
| 11.4.3 | The impact of pH on sulfide precipitation | 299 |
| 11.5 | Application and Design of Sulfide-Based Metal Precipitation | 302 |
| 11.6 | Biological H ₂ S Production for Metal Recovery | 303 |

| | | |
|--------|---|-----|
| 11.6.1 | Fundamental principles of microbial sulfate and sulfur reduction | 303 |
| 11.6.2 | Applications and design of biological sulfate and/or sulfur reduction | 304 |
| 11.6.3 | Case studies of implementation | 306 |
| 11.7 | Challenges, Opportunities and Research Needs | 312 |
| 11.8 | Chapter Summary | 312 |
| 11.9 | Exercises | 312 |
| 11.10 | Discussion Questions | 314 |
| | Further Reading Materials | 315 |
| | References | 315 |

Chapter 12

| | | |
|--|--|------------|
| | <i>Closing the loop within the water sector: circular resources</i> | 319 |
| | <i>Ilje Pikaar, Sirajus Salehin, Nadine Boelee, Arjen van Nieuwenhuijzen and Olaf van der Kolk</i> | |

| | | |
|--------|---|-----|
| 12.1 | Introduction | 319 |
| 12.2 | Learning Objectives | 320 |
| 12.3 | Circular Resources: Historical Context, Concepts, and Principles | 321 |
| 12.3.1 | Historical background – the creation of a consumption society with linear use of resources. | 321 |
| 12.3.2 | Concepts and principles | 321 |
| 12.4 | Circularity within the Water Sector | 324 |
| 12.4.1 | Circular resources within the water sector: real-life case studies | 326 |
| 12.5 | Chapter Summary | 333 |
| 12.6 | Exercises | 334 |
| 12.7 | Discussion Questions | 334 |
| | References | 337 |

Chapter 13

| | | |
|--|---|------------|
| | <i>Resource recovery from used water: The (European) regulator's point of view</i> | 339 |
| | <i>Ludwig Hermann and Ralf Hermann</i> | |

| | | |
|--------|--|-----|
| 13.1 | Introduction | 339 |
| 13.2 | Learning Objectives | 340 |
| 13.3 | European Policies | 340 |
| 13.3.1 | Overview of relevant policies in the context of resource recovery from wastewater. | 340 |
| 13.3.2 | The 2030 Energy Strategy | 341 |
| 13.3.3 | The Clean Air Package | 342 |
| 13.3.4 | Gothenburg Protocol. | 342 |
| 13.3.5 | The Bioeconomy Strategy | 342 |
| 13.3.6 | Circular Economy Package. | 343 |
| 13.4 | European Regulations. | 343 |
| 13.4.1 | Overview. | 343 |
| 13.4.2 | Fertilising Products Regulation | 343 |
| 13.4.3 | Animal By-product (ABP) Regulation | 346 |
| 13.4.4 | Plant Protection Products (PPP) Regulation | 346 |

| | | |
|---------|--|-----|
| 13.4.5 | REACH Regulation | 347 |
| 13.4.6 | CLP Regulation | 347 |
| 13.4.7 | Waste Shipment Regulation | 348 |
| 13.5 | European Directives | 349 |
| 13.5.1 | Overview. | 349 |
| 13.5.2 | Renewable Energy Directive (RED) | 349 |
| 13.5.3 | Liability of Defective Products Directive | 351 |
| 13.5.4 | Biofuels and Indirect Land Use Change Directive (ILUC) | 351 |
| 13.5.5 | Nitrates Directive. | 352 |
| 13.5.6 | Water Framework Directive (WFD) | 352 |
| 13.5.7 | Groundwater Directive. | 353 |
| 13.5.8 | Drinking Water Directive. | 353 |
| 13.5.9 | Bathing Water Directive | 354 |
| 13.5.10 | Marine Strategy Framework Directive | 354 |
| 13.5.11 | Urban Wastewater Directive | 355 |
| 13.5.12 | Sewage Sludge Directive. | 355 |
| 13.5.13 | Waste Framework Directive. | 356 |
| 13.5.14 | Landfill Directive. | 356 |
| 13.5.15 | Hazardous Waste Directive | 357 |
| 13.5.16 | Air Quality Directive. | 357 |
| 13.5.17 | Industrial Emissions Directive (IED) | 358 |
| 13.5.18 | National Emissions Ceilings (NEC) Directive | 359 |
| 13.6 | Outlook and Recommendations. | 359 |
| 13.7 | Chapter Summary | 360 |
| 13.8 | Discussion Questions | 361 |
| | References. | 362 |

Chapter 14

Economic analysis of resource recovery. 365

Roy Brouwer

| | | |
|-------|---|-----|
| 14.1 | Introduction | 365 |
| 14.2 | Learning Objectives | 366 |
| 14.3 | Financial and Economic Analysis | 366 |
| 14.4 | Cost-Benefit Analysis. | 366 |
| 14.5 | Making an Economic Case for Resource Recovery. | 368 |
| 14.6 | Cost and Effectiveness of Resource Recovery Technologies. | 369 |
| 14.7 | Broader Societal Effects of Resource Recovery | 370 |
| 14.8 | Economic Valuation of Resource Recovery Externalities. | 372 |
| 14.9 | Internalizing Externalities | 376 |
| 14.10 | Discounting | 376 |
| 14.11 | Economic Decision Criteria | 377 |
| 14.12 | Summary. | 378 |
| 14.13 | Discussion Questions | 379 |
| | Further Reading. | 381 |
| | References. | 381 |

Chapter 15

| | |
|---|------------|
| <i>Resource recovery from wastewater and the consumer point of view: social, cultural and economic aspects</i> | 383 |
| <i>Pay Drechsel, Miriam Otoo and Munir A. Hanjra</i> | |
| 15.1 Introduction | 383 |
| 15.2 Learning Objectives | 387 |
| 15.3 Factors Influencing Acceptance of Resources Recovery from Wastewater | 387 |
| 15.4 Acceptance of Treated Wastewater for Potable and Non-Potable Purposes. | 388 |
| 15.4.1 Knowledge, perceptions, and acceptability. | 388 |
| 15.4.2 Accepting safety interventions for untreated or diluted wastewater use in agriculture | 393 |
| 15.5 Acceptance of Recovered Nutrients from Wastewater from Sewered Systems | 397 |
| 15.5.1 Biosolids recovery and use | 397 |
| 15.5.2 Phosphorus recovery and use. | 398 |
| 15.5.3 Wastewater-based aquaculture. | 400 |
| 15.5.4 Wastewater from non-sewered systems (onsite sanitation systems) as a nutrient source | 402 |
| 15.6 Gender Aspects of Wastewater Use. | 404 |
| 15.7 Chapter Summary | 405 |
| 15.8 Exercises | 406 |
| 15.9 Discussion Questions | 407 |
| Acknowledgements | 407 |
| References | 408 |

Chapter 16

| | |
|--|------------|
| <i>The environmental impacts of resource recovery</i> | 415 |
| <i>Tessa van den Brand and Aalke Lida de Jong</i> | |
| 16.1 Environmental Impacts beyond Local Water Quality. | 415 |
| 16.2 Learning Objectives | 416 |
| 16.3 Conceptual Overview | 416 |
| 16.3.1 Life cycle assessment. | 416 |
| 16.3.2 Typical LCA steps | 416 |
| 16.3.3 Impact assessment | 417 |
| 16.3.4 LCA standards (ISO standards) | 419 |
| 16.3.5 (Avoided) emissions. | 419 |
| 16.3.6 Interpretation | 419 |
| 16.4 Case Studies | 420 |
| 16.4.1 LCA as quick scan analysis. | 420 |
| 16.4.2 An intensive LCA study: Calcite | 422 |
| 16.5 Challenges Moving Forward | 424 |
| 16.5.1 Environmental impact terms | 425 |
| 16.5.2 Data inventory | 425 |
| 16.5.3 Completeness and representativeness of database information. | 425 |
| 16.5.4 The representative case study. | 426 |
| 16.5.5 Evaluating future improvements to resource recovery processes | 426 |
| 16.5.6 Market information | 426 |
| 16.5.7 Allocation and system expansion. | 426 |

16.5.8 Process design and its influence on resource recovery (and vice versa) 427

16.5.9 Comparisons with previous studies 427

16.6 Chapter Summary 427

16.7 Exercises 428

16.8 Discussion Questions 428

Further Reading 429

References 429

Chapter 17

Resource recovery 2050 and beyond: water in a climate-neutral and cyclic economy 431
Willy Verstraete
 References 432

Outlook for the carbon-negative circular water economy 433
Glen T. Daigger
 Reference 436

Hastening the arrival of the resource recovering water future 437
David L. Sedlak
 References 440

One water/one health: Used water management in 2050 and beyond 443
Julian Sandino

17.1 One Water, One Health 444

17.2 Give Up the Crystal Ball 444

17.3 Dare to Disrupt 444

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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