

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Objectives, Motivation and Potential Use of the WtE Approach	1
1.2	Waste Processing and WtE	4
1.3	Waste-to-Energy Unit	6
1.4	New Terminology for Up-to-Date Approach	11
1.5	Alternative Methods	12
<b>2</b>	<b>Conceptual Approach</b>	<b>13</b>
2.1	Waste Availability	15
2.2	Energy Utilization	17
<b>3</b>	<b>Investment Planning Based on NERUDA System</b>	<b>19</b>
3.1	Optimization Computational Tool NERUDA	22
3.2	Results of Calculations	25
<b>4</b>	<b>WtE as Integrated Items—REGION and EVELINE Systems</b>	<b>31</b>
4.1	Characteristics of Region/Micro-region	31
4.2	REGION and EVELINE as Its Part	32
4.3	A Case Study: Application of REGION and EVELINE in a Micro-region with Thirty Thousand Inhabitants	34
<b>5</b>	<b>Selection of Convenient Technology</b>	<b>37</b>
5.1	Large or Small Capacity Incinerators?	37
5.2	“Conventional” Versus Up-to-Date Technologies	39
5.3	Tailor-Made Technology as the Core of EVELINE	41
<b>6</b>	<b>Subsystems, Equipment and Other Aspects</b>	<b>45</b>
6.1	Thermal System	46
6.1.1	Combustion Chamber	46
6.1.2	Burners	48

6.2	Energy Recovery . . . . .	53
6.2.1	Variety of Heat Recovery Systems and Equipment . . . . .	54
6.2.2	Heat Exchangers: Fouling and Cleaning . . . . .	57
6.2.3	Co-generation . . . . .	64
6.3	Off-Gas Cleaning System . . . . .	67
6.3.1	Cleaning Methods According to Type of Pollutants . . . . .	68
6.3.2	Reduction of Nitrogen Oxides. . . . .	68
6.3.3	Neutralization of Acid Compounds and Filtration . . . . .	70
6.4	Safety and Reliability Requirements and Standards . . . . .	75
6.5	Process Control Aspects . . . . .	76
<b>7</b>	<b>Computational Support . . . . .</b>	<b>81</b>
7.1	Conceptual Approach . . . . .	83
7.2	Simulations Based on Heat and Mass Balance . . . . .	84
7.3	Calculations of Equipment . . . . .	86
7.4	Structural Design . . . . .	87
7.5	Utilization of CFD . . . . .	88
7.6	Optimization on Equipment Level . . . . .	90
7.7	Process and Heat Integration . . . . .	91
<b>8</b>	<b>Conclusions . . . . .</b>	<b>93</b>
	<b>References . . . . .</b>	<b>95</b>

Up-to-Date Waste-to-Energy Approach

From Idea to Industrial Application

Stehlik, P.

2016, XIV, 101 p. 64 illus., 4 illus. in color., Softcover

ISBN: 978-3-319-15466-4