



ENVIRONMENTAL BUSINESS INTERNATIONAL, INC.

Research, Consulting and Publishing for the Environmental Industry

EBI REPORT 217

Solid Waste Management, Resource Recovery & Waste Management Equipment

Overview of Markets and Competition

October 2016

EBI Report 217

Solid Waste Management, Resource Recovery & Waste Management Equipment

Table of Contents

1.	Acknowledgements.....	2-8
1.1.	About EBI.....	2-8
1.2.	Disclaimer.....	2-9
1.3.	Copyright.....	2-10
2.	The U.S. Environmental Industry Overview.....	2-10
2.6.1.	<i>Definition of the Environmental Industry.....</i>	<i>2-11</i>
2.6.2.	<i>Environmental Industry Segments.....</i>	<i>2-11</i>
3.	Solid Waste Management.....	2-13
3.6.	Market Size.....	2-13
3.6.1.	<i>Positive Outlook In Solid Waste in 2016.....</i>	<i>2-26</i>
3.6.2.	<i>Key Solid Waste M&A Transactions in 2015-2016.....</i>	<i>2-29</i>
3.6.3.	<i>2012 Market Analysis.....</i>	<i>2-32</i>
3.6.4.	<i>2011 Report on Recycling, MSW and WME.....</i>	<i>2-38</i>
3.6.5.	<i>2008 Update.....</i>	<i>2-52</i>
3.6.6.	<i>2006 Update.....</i>	<i>2-57</i>
3.6.7.	<i>Waste Generation and Disposal in 2001.....</i>	<i>2-60</i>
3.7.	Solid Waste Management Markets.....	2-62
3.8.	Collection Markets.....	2-65
3.9.	Processing Markets.....	2-68
3.10.	Disposal Markets.....	2-70
3.11.	Geographic Distribution of Solid Waste Management Markets.....	2-78
3.12.	Other Solid Waste Management Segments.....	2-87
3.12.1.	<i>Recycling.....</i>	<i>2-87</i>
3.12.2.	<i>Landfill Gas.....</i>	<i>2-90</i>
3.12.3.	<i>Composting.....</i>	<i>2-90</i>
3.13.	Emerging Markets in Solid Waste Management.....	2-92
3.13.1.	<i>Waste Conversion.....</i>	<i>2-92</i>
3.13.2.	<i>Waste Conversion Projects Coming Online in North America in 2012-2013.....</i>	<i>2-94</i>
3.13.3.	<i>Waste-To-Energy & Landfill Gas in 2012.....</i>	<i>2-96</i>
3.13.4.	<i>Food Waste & Organic Waste Management.....</i>	<i>2-106</i>
3.13.5.	<i>Profile: Dirt Huggers: Barriers Beyond Shovels.....</i>	<i>2-113</i>
3.13.6.	<i>Profile: AI Organics: End Markets Tough.....</i>	<i>2-115</i>
3.13.7.	<i>Profile: Harvest Power: Energy Is Now.....</i>	<i>2-116</i>
3.13.8.	<i>Profile: Lenz Enterprises Enjoys Success In Composting.....</i>	<i>2-117</i>
3.13.9.	<i>E-Waste Management.....</i>	<i>2-120</i>
3.14.	Competition in Solid Waste Management.....	2-131
3.14.1.	<i>Top Solid Waste Management Companies.....</i>	<i>2-135</i>
3.14.2.	<i>Profile: Republic Services.....</i>	<i>2-151</i>
3.14.3.	<i>Profile: Veolia Environmental Services: Innovations in Waste-to-Resource.....</i>	<i>2-157</i>
3.14.4.	<i>Banker Observations: Morgan Joseph.....</i>	<i>2-160</i>
3.14.5.	<i>Leading Firms in Waste to Energy.....</i>	<i>2-164</i>
3.14.6.	<i>Biomass on the Frontier.....</i>	<i>2-165</i>
3.14.7.	<i>Municipal Solid Waste Authorities.....</i>	<i>2-171</i>

	Source Separation Of Organics Advances Slowly	2-171
	Compostable Organics out of Landfills by 2012; COOL 2012	2-180
3.15.	Strategies for Success	2-182
3.15.1.	Casella Waste	2-183
4.	Resource Recovery.....	4-187
4.6.	SCS Engineers	4-187
4.7.	WIH Resource Group	4-191
5.	Resource Recovery.....	5-193
5.1.	Resource Recovery Market	5-193
5.1.1.	2014-2015 Data & Trend Review.....	5-196
	Energy Value In Biogas.....	5-204
5.1.2.	Unpacking Two 2016 Reports On Recycling In The USA	5-206
5.1.3.	2012 Data & Trend Review	5-209
5.1.4.	2010 Trend Review	5-212
5.1.5.	2008 Trend Review	5-222
5.1.6.	2006 Trend Review	5-226
5.1.7.	2004 Trend Review	5-230
5.1.8.	2002 Trend Review	5-239
5.2.	Niche Markets.....	5-243
5.2.1.	Photo Waste Recycling	5-243
5.3.	E-Waste	5-247
5.3.1.	Responsible Management	5-248
5.3.2.	Lamp Recycling.....	5-256
5.4.	Paper Recycling	5-259
5.5.	Plastics Recycling	5-261
5.6.	Aluminum Recycling.....	5-265
5.7.	Steel Recycling	5-270
5.8.	Glass Recycling.....	5-272
5.9.	Tires.....	5-273
5.10.	Construction & Demolition Recycling	5-273
6.	Waste Management Equipment.....	6-276
6.1.	Waste Management Equipment Market	6-276
6.1.1.	Mobile Refuse Transportation Equipment: Types of Garbage Trucks	6-280
6.1.2.	2008 Update.....	6-282
6.1.3.	2006 Update.....	6-284
6.1.4.	2004 Trend Review	6-286
6.1.5.	2003 Trend Review	6-288
6.2.	WME Company Profiles.....	6-289
6.2.1.	Compaction America.....	6-289
6.2.2.	Heil Environmental Industries	6-292
6.2.3.	Morbark Inc.	6-295
6.2.4.	Rehrig Pacific Company	6-298
6.2.5.	Leach Company.....	6-300
6.2.6.	Wastequip	6-303
6.3.	Leading Companies in Waste Management Equipment	6-306
6.3.1.	Selected Companies in Waste Containers.....	6-306
6.3.2.	Selected Companies in Liners	6-306
6.3.3.	Selected Companies in Recycling Equipment	6-307
6.3.4.	Companies in Waste Vehicles and Bodies.....	6-308

List of Exhibits

Exhibit 2-1	Environmental Industry Segments.....	2-12
Exhibit 3-1	U.S. Solid Waste Management Market: 2006-2016e (\$bil)	2-13
Exhibit 3-2	Size of the Solid Waste Market by Business Type, 2015	2-15
Exhibit 3-3	Size of the Solid Waste Market by Business Type, 2014.....	2-15
Exhibit 3-4	Size of the Solid Waste Market by Business Type, 2010.....	2-16
Exhibit 3-5	Size of the Solid Waste Market by Business Type, 2010.....	2-16
Exhibit 3-6	Size of the Solid Waste Market by Business Type, 2007.....	2-16
Exhibit 3-7	Size of the Solid Waste Market by Business Type, 2004.....	2-17
Exhibit 3-8	Size of the Solid Waste Market by Business Type, 2001	2-17
Exhibit 3-9	Size of the Solid Waste Market by Industry Segment, 2007-2009.....	2-18
Exhibit 3-10	Size of the Solid Waste Market by Industry Segment, 2004	2-19
Exhibit 3-11	Size of the Solid Waste Market by Industry Segment, 2001	2-20
Exhibit 3-12	Structure of the U.S. Solid Waste Industry: 2006	2-22
Exhibit 3-13	Structure of the U.S. Solid Waste Industry: 2009	2-22
Exhibit 3-14	Structure of the U.S. Solid Waste Industry: 2010	2-22
Exhibit 3-15	Number of Landfills in the United States, 1988 - 2010.....	2-23
Exhibit 3-16	Existing and Projected Solid Waste Market by Participant (in Billions \$).....	2-24
Exhibit 3-17	Composition of U.S. Waste Stream 2012.....	2-26
Exhibit 3-18	Generation of MSW, 2010	2-26
Exhibit 3-19	Republic 2011 Revenue Factors.....	2-32
Exhibit 3-20	Solid Waste Market Volume in 2007	2-53
Exhibit 3-21	Trends in Waste Generation & Disposal in the U.S., 2000 - 2001	2-61
Exhibit 3-22	Number of Operating Waste Disposal Operations, 2001	2-61
Exhibit 3-23	Volumes, Average Prices & Revenues from Landfilling MSW, 2001 & 2000.....	2-61
Exhibit 3-24	2000 to 2001 Materials Recovery Volumes	2-62
Exhibit 3-25	Disposition of Municipal Solid Waste 1989-1998	2-62
Exhibit 3-26	Size of the Solid Waste Market by Industry Segment, 2007.....	2-63
Exhibit 3-27	Size of the Solid Waste Market by Industry Segment, 2004.....	2-63
Exhibit 3-28	Historical and Projected Growth in Solid Waste Management (\$bil)	2-64
Exhibit 3-29	Historical and Projected Growth in Solid Waste Management	2-65
Exhibit 3-30	Solid Waste Collection Markets, 2007	2-66
Exhibit 3-31	Solid Waste Collection Markets, 2006	2-66
Exhibit 3-32	Solid Waste Collection Markets, 2005	2-67
Exhibit 3-33	Solid Waste Collection Markets, 2004	2-67
Exhibit 3-34	Solid Waste Collection Markets, 2001	2-68
Exhibit 3-35	Growth in the Number of U.S. Recycling Facilities and Programs.....	2-69
Exhibit 3-36	Number of Landfills by Region and Ownership, 2001	2-71
Exhibit 3-37	Number of Landfills by Region and Ownership, 1991	2-71
Exhibit 3-38	Average Landfill Monthly Tipping Fees by Region 2007-2008	2-71
Exhibit 3-39	Waste Disposal Pricing by Type of Facility, State, and Region, 2008.....	2-72
Exhibit 3-40	Tip Fees: 2008-2011	2-73
Exhibit 3-41	U.S. Solid Waste Industry: Average Tip Fees: 2003 – 2010.....	2-73
Exhibit 3-42	Average Tip Fees for MSW Charged by Landfills by Region and Ownership, 2001 (in \$/Ton)	2-73
Exhibit 3-43	Average Tip Fees for MSW, 1991 (in \$/Ton)	2-74
Exhibit 3-44	Number of Landfills in the United States (1989-2004).....	2-74
Exhibit 3-45	Number of Landfills in the United States, 1988 - 2010.....	2-75
Exhibit 3-46	2009 Number of Landfills	2-75
Exhibit 3-47	Municipal Waste-To-Energy Projects	2-75
Exhibit 3-48	Number of Incinerators in the United States (1989-96)	2-76
Exhibit 3-49	Materials Recovery Facilities	2-77

Exhibit 3-50	NUMBER AND POPULATION SERVED BY CURBSIDE RECYCLABLES COLLECTION PROGRAMS, 2009	2-78
Exhibit 3-51	Average landfill tonnage and price per day in SW collection/processing 2007-2008	2-79
Exhibit 3-52	Waste Disposal Volumes by Type of Facility, State, and Region, 2008	2-81
Exhibit 3-53	Trends in Waste Generation & Disposal by State, 2000 - 2001 (in Millions of tons)	2-83
Exhibit 3-54	Number of Operating Waste Disposal Operations by State in 2001	2-84
Exhibit 3-55	Volumes, Average Prices & Revenues from Landfilling MSW by State, 2001 & 2000	2-85
Exhibit 3-56	Year-to-Year Materials Recovery Volumes by State (in Millions of Tons)	2-86
Exhibit 3-57	Management of Used and End-Of-Life Electronics in 2009	2-121
Exhibit 3-58	Global E-Scrap and E-Waste Generation (million tons)	2-123
Exhibit 3-59	Chemical Substances of Concern and Priority Items in E-Waste	2-125
Exhibit 3-60	State Laws and Programs for Electronic Waste	2-130
Exhibit 3-61	U.S. Solid Waste Industry: Shares by Company Type: 2003-2013	2-132
Exhibit 3-62	Shares by Company Type: 2003-2010	2-132
Exhibit 3-63	Market Share in Solid Waste Management by Competitor Type, 1999 - 2008	2-133
Exhibit 3-64	Shares of U.S. Solid Waste Industry: 2005	2-133
Exhibit 3-65	Shares of U.S. Solid Waste Industry: 2010	2-134
Exhibit 3-66	Shares of U.S. Solid Waste Industry: 2015	2-135
Exhibit 3-67	Top 100 Firms in the Solid Waste Industry: 2015	2-135
Exhibit 3-68	Top Firms in the Solid Waste Industry: 2014	2-137
Exhibit 3-69	Top 100 Firms in the Solid Waste Industry: 2010	2-142
Exhibit 3-70	Top 75 Firms in the Solid Waste Industry: 2007	2-144
Exhibit 3-71	Top Firms in the Solid Waste Industry: 2004-2009	2-146
Exhibit 3-72	Top 75 Firms in the U.S. Solid Waste Industry: 2005	2-147
Exhibit 3-73	Leading Companies in Solid Waste Management, 2004	2-149
Exhibit 3-74	Leading Companies in Solid Waste Management, 2001	2-150
Exhibit 3-75	Distribution of Revenues in U.S. Solid Waste Industry, 2006	2-150
Exhibit 3-76	Distribution of Revenues in U.S. Solid Waste Industry, 2001	2-151
Exhibit 3-77	Waste Management Business Breakdown	2-151
Exhibit 3-78	Republic Services by the Numbers	2-156
Exhibit 3-79	Largest Waste-to-Energy Companies Ranked by Total Capacity	2-165
Exhibit 5-1	Historical and Projected Growth in Resource Recovery	5-194
Exhibit 5-2	Sales of Recovered Materials in/from the U.S., 1995-2005 (\$bil)	5-195
Exhibit 5-3	Sales of Recovered Materials in/from the U.S., 2005-2015 (\$bil)	5-195
Exhibit 5-4	Exports of Recovered Materials from the U.S., 1995-2005 (\$bil)	5-195
Exhibit 5-5	Sales of Recovered Materials in the U.S., 2004 (\$bil)	5-196
Exhibit 5-6	Sales of Recovered Materials in the U.S., 2007 (\$bil)	5-196
Exhibit 5-7	Generation, Materials Recovery, Composting, Combustion With Energy Recovery, and Discards of MSW, 1960 to 2010 (in millions of tons)	5-209
Exhibit 5-8	Generation and Recovery of Materials in MSW, 2010* (in millions of tons and percent of generation of each material)	5-210
Exhibit 5-9	Generation and Recovery of Products in MSW, 2010* (in millions of tons and percent of generation of each product)	5-211
Exhibit 5-10	Waste Paper - Exports and Domestic, 1994-2004	5-260
Exhibit 5-11	Waste Paper - Exports and Domestic, 2005-2007	5-261
Exhibit 5-12	Waste Paper - Exports and Domestic 2008-2010	5-261
Exhibit 5-13	Plastic - Exports and Domestic, 1994-2004	5-263
Exhibit 5-14	Plastic - Exports and Domestic, 2008-2010	5-264
Exhibit 5-15	Plastic - Exports and Domestic, 2005-2007	5-264
Exhibit 5-16	Aluminum Cans- Exports and Domestic, 1994 - 2004	5-266
Exhibit 5-17	Aluminum Cans- Exports and Domestic, 2005-2007	5-267
Exhibit 5-18	Aluminum Scrap - Exports and Domestic, 1994-2004	5-268
Exhibit 5-19	Aluminum Scrap - Exports and Domestic, 2005-2007	5-269
Exhibit 5-20	Steel/Ferrous Scrap - Domestic and Exports 1994 - 2004	5-271
Exhibit 5-21	Steel/Ferrous Scrap - Domestic and Exports 2005-2007	5-272
Exhibit 5-22	Steel/Ferrous Scrap - Domestic and Exports, 2008-2010	5-272

Exhibit 5-23	Leading Companies in Recycling	5-275
Exhibit 6-1	Waste U.S. Revenues Generated from Sales of Waste Management Equipment 1988-2012	6-276
Exhibit 6-2	Waste Management Equipment Market by Major Equipment Category 2003-2012	6-277
Exhibit 6-3	Waste Management Equipment Breakdown: 2003 - 2012	6-278
Exhibit 6-4	Historical Sales of Waste Management Equipment, 1991-2001	6-279
Exhibit 6-5	U.S. Environmental Industry 1991-2000 (\$bil).....	6-279
Exhibit 6-6	Growth in Waste Management Equipment 1988-2012	6-283