



ENVIRONMENTAL BUSINESS INTERNATIONAL, INC.

Research, Consulting and Publishing for the Environmental Industry

Presents

EBI Report 1017

Air Pollution Control Equipment

Overview of Markets and Competition

2011

Researched and written by:

Environmental Business International Inc.

4452 Park Blvd, Suite 306

San Diego, CA 92116 USA

Air Pollution Control Equipment Table of Contents

1. AIR POLLUTION CONTROL EQUIPMENT.....	7
1.1. Acknowledgements: Authors and Sources.....	7
1.1.1. EBJ's Market Research Method.....	7
1.1.2. Disclaimer.....	9
1.1.3. Copyright.....	10
1.2. Air Pollution Control Equipment.....	10
1.3. Total Air Quality Market Overview.....	11
1.3.1. Air Pollution Control Equipment.....	12
1.3.2. Consulting & Engineering.....	15
1.3.3. Trends in Air C&E Markets and Market Drivers.....	24
1.3.4. Compliance Drivers for C&E Firms.....	26
1.3.5. Environmental Instrumentation.....	27
1.3.6. Mobile Sources.....	31
1.3.7. Indoor Air Quality.....	38
1.3.8. Emissions Credit Trading.....	45
1.4. Markets for Stationary Source APC Equipment.....	51
1.4.1. Historical Development of Stationary Source APC Markets.....	52
1.4.2. Historical Context for APC Markets in the 90s.....	53
1.4.3. Market Trend Analysis in 2010.....	56
1.4.4. Market Trend Analysis in 2007.....	59
1.4.5. Market Trend Analysis in 2005.....	64
1.4.6. Market Trend Analysis in 2002.....	72
1.4.7. APC Equipment Market by Equipment Type.....	79
1.4.8. APC Equipment Market by Pollutant.....	83
1.4.9. APC Equipment Market by Customer Type.....	88
1.4.10. 2007 Utility Review.....	92
1.4.11. Geographic Distribution of APC Equipment Markets.....	103
1.4.12. APC Equipment Market Industry Structure.....	105
1.4.13. Top APC Equipment Companies.....	107
1.4.14. Top APC Equipment Companies by Equipment Type.....	110
1.4.15. Top APC Equipment Companies by Equipment Type 1997.....	113
1.4.16. Top APC Equipment Companies by Pollutant Type.....	116
1.5. APC Regulations and Growth Areas.....	120
1.5.1. Historical Context of The Clean Air Act.....	120
1.5.2. Major Long-Term CAAA Business Opportunities.....	123
1.5.3. Review of Air Quality Policy & Market Drivers.....	127
1.5.4. Air Quality Policy 2010 Update.....	135
1.5.5. Biomass-Fired Power Regulation.....	147
1.5.6. Climate Change Policy.....	152
1.5.7. Air Quality Policy 2008 Update.....	161
1.6. APC Services and Technologies.....	189
1.6.1. Multi-Pollutant Control Approach.....	189
1.6.2. NOx Prevention and Control.....	191
1.6.3. VOC Control Market.....	195
1.6.4. Mercury Technology.....	201
1.6.5. Post-Combustion Co ₂ Capture.....	202
1.7. Future Trends and Growth Scenarios.....	205
1.8. Profiles of Leading APC Equipment Companies.....	209
1.8.1. AdvantaClean Systems, Inc. (2011).....	209
1.8.2. DuPont (2011).....	212
1.8.3. CECO (2008).....	216
1.8.4. Anguil Environmental Systems (2008).....	218

1.8.5.	<i>Peerless Mfg. Co.</i>	222
1.8.6.	<i>GE Energy (2005)</i>	225
1.8.7.	<i>Rentar (2005)</i>	228
1.8.8.	<i>Anguil Environmental (2005)</i>	231
1.8.9.	<i>John Zink (2005)</i>	234
1.8.10.	<i>Horiba Group (2005)</i>	236
1.8.11.	<i>Alstom Power and Environmental Control Systems (2002)</i>	239
1.8.12.	<i>Anguil Environmental Systems, Inc. (2002)</i>	242
1.8.13.	<i>Fuel Tech Inc. (2002)</i>	245
1.8.14.	<i>Hamon Research-Cottrell, Inc. (2002)</i>	247
1.8.15.	<i>Environmental Elements Corp. (2002)</i>	250
1.8.16.	<i>Croll-Reynolds Clean Air Technologies (2002)</i>	253
1.8.17.	<i>KleenAir Systems Inc. (2002)</i>	255
1.8.18.	<i>Thermatrix, Inc. (2002)</i>	258
1.8.19.	<i>GE Power Systems (2002)</i>	260
1.8.20.	<i>ABB Environmental Systems (1998)</i>	263
1.8.21.	<i>Babcock & Wilcox Power Generation Group (1998)</i>	265
1.8.22.	<i>Wheelabrator Air Pollution Control, Inc. (1998)</i>	269
1.8.23.	<i>Belco Technologies Corp. (1998)</i>	272
1.8.24.	<i>Durr Environmental Inc. (1998)</i>	273
1.8.25.	<i>Johnson Matthey (1998)</i>	277
1.9.	Profiles of Leading APC Consulting & Engineering Firms	281
1.9.1.	<i>James Strock & Co. (2011)</i>	281
1.9.2.	<i>Seventh Generation Advisors (2011)</i>	284
1.9.3.	<i>Alstom Group (2011)</i>	289
1.9.4.	<i>Burns & McDonnell Engineering (2008)</i>	292
1.9.5.	<i>Barr Engineering (2008)</i>	296
1.9.6.	<i>Black & Veatch (2008)</i>	299
1.9.7.	<i>Trinity Consultants Inc. (2008)</i>	302
1.9.8.	<i>Black & Veatch (2005)</i>	306
1.9.9.	<i>Environ Corp. (2005)</i>	309
1.9.10.	<i>Earth Tech (2005)</i>	312
1.9.11.	<i>Trinity Consultants (2005)</i>	314
1.9.12.	<i>ETS Inc. (2005)</i>	317
1.9.13.	<i>Minnich and Scotto Inc. (2005)</i>	319
1.9.14.	<i>2001 Air Consulting Review with TRC, ERM, ENSR and Trinity (2002)</i>	322
1.9.15.	<i>Radian International (now URS; 1998)</i>	327
1.9.16.	<i>ENSR Consulting & Engineering (1998)</i>	329
1.9.17.	<i>TRC Environmental (1998)</i>	333
1.9.18.	<i>Trinity Consultants, Inc. (1998)</i>	336
1.10.	Asia Review	339
1.10.1.	<i>Market Overview</i>	339
1.10.2.	<i>China</i>	343
1.10.3.	<i>Japan, Australia/New Zealand</i>	344
1.10.4.	<i>South Korea and Taiwan</i>	344
1.10.5.	<i>Long-Term Markets</i>	345

Air Pollution Control Equipment List of Exhibits

Exhibit 1-1	Air Quality Business Segments 1994-2010	12
Exhibit 1-2	2011 World Air Pollution Control Market (\$ Billions)	13
Exhibit 1-3	Mobile Source vs. Stationary Source, 2004 - 2010.....	14
Exhibit 1-4	Historical and Projected Growth in the U.S. APC Segment: Stationary Source Equipment and Mobile.....	14
Exhibit 1-5	Components of the Air Consulting Market.....	15
Exhibit 1-6	Top Environmental Consulting & Engineering (C&E) Firms Reporting Revenues in Air Quality Consulting Services, 2009.....	17
Exhibit 1-7	The Top Air Consulting Firms, 2007 (\$ mil).....	18
Exhibit 1-8	Top 30 Environmental Consulting & Engineering Firms in Air Quality Consulting	20
Exhibit 1-9	Top 30 Environmental Consulting & Engineering Firms in Air Quality Consulting, 2003.....	21
Exhibit 1-10	Historical and Projected Growth in the U.S. Air Quality Consulting & Engineering Services Segment (in \$million) 1970-2012.....	23
Exhibit 1-11	Percent of Air Quality Revenues in the US C&E Market Historical and Projected, 1970 to 2012	24
Exhibit 1-12	Top Environmental Instrument Companies in 2006	28
Exhibit 1-13	Growth in the U.S. Air Quality Instruments Segment	29
Exhibit 1-14	Primary Monitoring Strategies Expected Under CAM.....	30
Exhibit 1-15	Top Mobile Source Emission Control Systems Manufacturers in the U.S.	31
Exhibit 1-16	Historical and Projected Growth in the California Mobile Source APC Equipment Segment, 1970 - 2010	33
Exhibit 1-17	Historical and Projected Growth in the U.S. Mobile Source APC Equipment Segment, 1970 - 2010	33
Exhibit 1-18	Watched Markets, March 18 2005	47
Exhibit 1-19	EU Markets, March 21 2005.....	47
Exhibit 1-20	Historical and Projected Growth in the U.S. Stationary Source APC Equipment Segment, 1970 - 2011	53
Exhibit 1-21	Electrostatic Precipitator Market Leaders, 2005	67
Exhibit 1-22	APC Equipment Purchases in China, 2005	69
Exhibit 1-23	APC Equipment Market by Equipment Type, 1994	80
Exhibit 1-24	APC Equipment Market by Equipment Type, 1997	80
Exhibit 1-25	APC Equipment Market by Equipment Type, 2001	81
Exhibit 1-26	APC Equipment Market by Equipment Type, 2004	81
Exhibit 1-27	APC Equipment Market by Equipment Type, 2007	82
Exhibit 1-28	APC Equipment Market by Equipment Type, 2010	83
Exhibit 1-29	APC Equipment Market by Equipment Type, 2002 - 2010.....	83
Exhibit 1-30	APC Equipment Market by Pollutant, 1994	84
Exhibit 1-31	APC Equipment Market by Pollutant, 1997	85
Exhibit 1-32	APC Equipment Market by Pollutant, 2001	85
Exhibit 1-33	APC Equipment Market by Pollutant, 2004	86
Exhibit 1-34	APC Equipment Market by Pollutant, 2007	86
Exhibit 1-35	APC Equipment Market by Pollutant, 2010	87
Exhibit 1-36	APC Equipment Market by Pollutant, 2002 - 2010	87
Exhibit 1-37	Share of APC Equipment Market by Power Utilities, 1990 - 2004	88
Exhibit 1-38	APC Equipment Market by Customer Type, 1994	89
Exhibit 1-39	APC Equipment Market by Customer Type, 1997	89
Exhibit 1-40	APC Equipment Market by Customer Type, 2001	90
Exhibit 1-41	APC Equipment Market by Customer Type, 2004	90

Exhibit 1-42	APC Equipment Market by Customer Type, 2007	91
Exhibit 1-43	APC Equipment Market by Customer Type, 2010	91
Exhibit 1-44	APC Equipment Market by Customer Type, 2003-2010.....	92
Exhibit 1-45	Emissions Control Projects at U.S. Coal-Fired Power Plants.....	101
Exhibit 1-46	APC Equipment Market by State.....	104
Exhibit 1-47	APC Equipment Markets by State	105
Exhibit 1-48	U.S. Stationary Source APC Equipment Industry, 2003	106
Exhibit 1-49	U.S. Stationary Source APC Equipment Industry, 2001	106
Exhibit 1-50	APC Equipment Market Industry Structure, 1997.....	106
Exhibit 1-51	The Top APC Equipment Companies in the U.S. Market, 2004-2006.....	107
Exhibit 1-52	The Top APC Equipment Companies in the U.S. Market, 2001	108
Exhibit 1-53	The Top APC Equipment Companies in the U.S. Market, 1997	109
Exhibit 1-54	APC Equipment & Technology: Top Suppliers 2010	110
Exhibit 1-55	The Top APC Equipment Companies - Flue Gas Desulphurization, 2004.....	111
Exhibit 1-56	The Top APC Equipment Companies - Electrostatic Precipitators, 2004	111
Exhibit 1-57	The Top APC Equipment Companies - Fabric Filters & Baghouse Equipment, 2004.....	112
Exhibit 1-58	The Top APC Equipment Companies - Oxidation Systems, 2004	112
Exhibit 1-59	The Top APC Equipment Companies - NOx Control, 2004	113
Exhibit 1-60	The Top APC Equipment Companies - Flue Gas Desulphurization, 1997.....	113
Exhibit 1-61	The Top APC Equipment Companies - Electrostatic Precipitators, 1997	114
Exhibit 1-62	The Top APC Equipment Companies - Fabric Filters & Baghouse Equipment, 1997.....	114
Exhibit 1-63	The Top APC Equipment Companies - Oxidation Systems, 1997	115
Exhibit 1-64	The Top APC Equipment Companies - NOx Control, 1997	115
Exhibit 1-65	The Top APC Equipment Companies - Carbon Absorption, 1997.....	115
Exhibit 1-66	The Top APC Equipment Companies - Particulates, 2004.....	116
Exhibit 1-67	The Top APC Equipment Companies - Sulfur Oxides, 2004	116
Exhibit 1-68	The Top APC Equipment Companies - VOCs, 2004	117
Exhibit 1-69	The Top APC Equipment Companies - HAPs, 2004.....	117
Exhibit 1-70	The Top APC Equipment Companies - NOx & CO, 2004.....	117
Exhibit 1-71	The Top APC Equipment Companies - Particulates, 1997.....	118
Exhibit 1-72	The Top APC Equipment Companies - Sulfur Oxides, 1997	118
Exhibit 1-73	The Top APC Equipment Companies - VOCs, 1997	119
Exhibit 1-74	The Top APC Equipment Companies - HAPs, 1997.....	119
Exhibit 1-75	The Top APC Equipment Companies - NOx & CO, 1997.....	119
Exhibit 1-76	Summary of Clean Air Act Amendment Sections	121
Exhibit 1-77	Summary of CAAA Business Opportunities	124
Exhibit 1-78	Key Multipollutant Proposals	133
Exhibit 1-79	EPA Air Regulation Schedule: 2011-2012	136
Exhibit 1-80	California ARB Emissions Trading: Major Program Elements Scope	154
Exhibit 1-81	2003-2005 Air-Related Enforcement Accomplishments	179
Exhibit 1-82	U.S. NOx Control Market Equipment Sales, 2002.....	192
Exhibit 1-83	Suppliers of Combustion Systems	192
Exhibit 1-84	Selected Processes and Companies in SOx and NOx Control.....	194
Exhibit 1-85	Emissions of Nonmethane VOCs from Industrial Processes.....	197
Exhibit 1-86	Regional Emission Estimates of Nonmethane VOCs (million metric tons)	198
Exhibit 1-87	Summary of VOC Abatement Technologies	199
Exhibit 1-88	Projected Growth in the California 'Core APC' and the Clean Air Products Segments (\$mil)	207
Exhibit 1-89	Percentage of the Air Quality Market Represented by the 'Core APC' versus the Clean Air Products Segments, 1970-2010	208