

MST047B – Table of Contents

INTRODUCTION	XVII
STUDY GOAL AND OBJECTIVES	XVII
REASONS FOR DOING THE STUDY	XVII
INTENDED READERSHIP	XVII
SCOPE OF REPORT	XVIII
METHODOLOGY	XVIII
INFORMATION SOURCES	XIX
ANALYST CREDENTIALS	XIX
RELATED BCC RESEARCH PUBLICATIONS	XIX
BCC ONLINE SERVICES	XX
DISCLAIMER	XX
SUMMARY	XXI
SUMMARY TABLE GLOBAL MBR MARKET VALUE, THROUGH 2013 (\$ MILLIONS)	XXIII
SUMMARY FIGURE GLOBAL MBR MARKET VALUE, 1990–2013 (\$ MILLIONS)	XXIII
OVERVIEW	1
HISTORY	1
AMOUNTS OF WATER TO BE TREATED	1
GLOBAL WATER RESOURCES, WITHDRAWALS	2
FIGURE 1 GLOBAL FRESH WATER STRESS, 1995 AND FORECAST FOR 2025	3
U.S. WATER RESOURCES, WITHDRAWALS	3
MBRS IN BRIEF	4
MBRS IN BRIEF (CONTINUED)	5
MICROORGANISMS	6
AEROBIC, ANAEROBIC	7
TABLE 1 COMPARISON OF AEROBIC, ANAEROBIC MBRS	7
TABLE 2 PROJECTED GLOBAL VALUE OF MBRS BY TYPE OF MICROBIAL PROCESS, THROUGH 2013 (\$ MILLIONS)	8
FIGURE 2 PROJECTED GLOBAL VALUE OF MBRS BY TYPE OF MICROBIAL PROCESS, 1990–2013 (\$ MILLIONS)	8
MEMBRANES	9
MATERIALS, MANUFACTURING METHODS, MODULES	9
FLUX	10
FOULING	10
SELECTING MEMBRANES FOR MBRS	11
SYSTEM CONFIGURATION: SUBMERGED, EXTERNAL	11
FIGURE 3 SCHEMATIC OF SUBMERGED MEMBRANE BIOREACTOR	12
FIGURE 4 SCHEMATIC OF EXTERNAL MEMBRANE BIOREACTOR	13
TABLE 3 PROJECTED GLOBAL VALUE OF MBRS BY CONFIGURATION, 1990–2013 (\$ MILLIONS)	14
FIGURE 5 PROJECTED GLOBAL VALUE OF MBRS BY CONFIGURATION, 1990–2013 (\$ MILLIONS)	14

TABLE 4 ADVANTAGES AND DISADVANTAGES OF MBR CONFIGURATIONS	15
TABLE 5 MAJOR MANUFACTURERS OF MBRS AND THEIR PRODUCTS	16
TABLE 5 (CONTINUED)	17
TECHNOLOGY DEVELOPMENT	17
PERFORMANCE	18
PARTICLE REMOVAL AND DISINFECTION	18
REMOVAL OF ORGANIC MATTER	18
NUTRIENT REMOVAL	18
TRACE ORGANIC COMPOUNDS	19
COMPETING WASTEWATER TREATMENT TECHNOLOGIES	19
TABLE 6 TECHNOLOGIES USED IN WASTEWATER TREATMENT	19
TABLE 6 (CONTINUED)	20
CAPITAL AND OPERATING COSTS	20
TABLE 7 CAPITAL AND OPERATING COSTS: MBR VS. ACTIVATED SLUDGE (300,000 GPD)	21
FIGURE 6 CAPITAL COSTS: MBR VS. ACTIVATED SLUDGE (300,000 GPD)	22
FIGURE 7 OPERATING COSTS: MBR VS. ACTIVATED SLUDGE	23
APPLICATIONS FOR MBR TECHNOLOGY	24
TABLE 8 APPLICATIONS FOR MBR TECHNOLOGY BY WASTEWATER TYPE, 2008 (%)	24
FIGURE 8 APPLICATIONS FOR MBR TECHNOLOGY BY NUMBER OF INSTALLED SYSTEMS, 2008 (%)	25
APPLICATIONS FOR MBR TECHNOLOGY (CONTINUED)	26
APPLICATIONS FOR MBR TECHNOLOGY (CONTINUED)	27
TABLE 9 PROJECTED GLOBAL VALUE OF MBRS BY APPLICATION, THROUGH 2013 (\$ MILLIONS)	28
FIGURE 9 PROJECTED GLOBAL VALUE OF MBRS BY APPLICATION, 1990–2013 (\$ MILLIONS)	28
DOMESTIC, MUNICIPAL WASTEWATER	28
TABLE 10 TYPICAL CONTAMINANTS IN UNTREATED MUNICIPAL WASTEWATER (MG/L)	29
DOMESTIC, MUNICIPAL WASTEWATER TREATMENT	30
INDUSTRIAL WASTEWATER	31
TABLE 11 POTENTIAL WASTEWATER COMPONENTS BY INDUSTRY	32
Heavy Metals	33
Organic Compounds	33
Oily Wastewaters	33
INDUSTRIAL WASTEWATER TREATMENT	33
LANDFILL LEACHATE	34
IN-BUILDING WATER RECYCLING	35
CRANFIELD IN-BUILDING STUDY	36
TABLE 12 COMPARISON OF SYSTEMS FOR IN-BUILDING WATER RECYCLING	36
OTHER WASTEWATER	37

SHIPBOARD WASTEWATER	37
Cruise Lines	38
World Navies	39
U.S. Navy	39
British Royal Navy	39
U.S. Coast Guard	40
AGRICULTURAL WASTEWATER	40
WATER RECLAMATION AND REUSE	41
REUSE IN THE U.S.	42
REUSE OUTSIDE OF THE U.S.	42
U.S. REGULATORY EFFORTS	43
FEDERAL ASSISTANCE FOR WASTEWATER PLANT CONSTRUCTION	44
INTERNATIONAL REGULATORY EFFORTS	44
EU REGULATIONS	45
OTHER REGULATIONS	45
TRENDS AND TECHNICAL DEVELOPMENTS	46
DRINKING WATER DENITRIFICATION	46
REMOVING TRACE ORGANIC COMPOUNDS	46
DESALINATION PRETREATMENT	47
WASTEWATER TREATMENT WITH SALEABLE BYPRODUCT RECOVERY	47
TREATMENT TO REMOVE OXIDIZED CONTAMINANTS	48
RESEARCH NEEDS	48
Research Needs (Continued)	49
PATENT SURVEY	50
BY COMPANY	50
TABLE 13 U.S. PATENT SURVEY BY COMPANY, 1991–2007 (NUMBER)	51
FIGURE 10 U.S. PATENT SURVEY BY COMPANY, 1991–2007 (%)	51
BY APPLICATION	52
TABLE 14 U.S. PATENT SURVEY BY APPLICATION, 1991–2007 (NUMBER)	52
FIGURE 11 PATENT SURVEY BY APPLICATION, 1991–2007 (%)	52
THE NORTH AMERICAN MARKET FOR MBR TECHNOLOGY	53
THE NORTH AMERICAN MARKET FOR MBR TECHNOLOGY	53
TABLE 15 VALUE OF THE NORTH AMERICAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	54
FIGURE 12 VALUE OF THE NORTH AMERICAN MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	55
U.S.	55
ECONOMIC TRENDS	55
WATER NEEDS	56
Water Needs (Continued)	56
CANADA	57
ECONOMIC TRENDS	57
WATER NEEDS	57
NORTH AMERICAN MBR EXPERIENCE	58

FIGURE 13 NORTH AMERICAN INDUSTRIAL MBR INSTALLATIONS BY INDUSTRY, 2006 (NUMBER)	59
NORTH AMERICAN DEVELOPMENT PROGRAMS FOR MBRS	60
DESALINATION AND WATER PURIFICATION TECHNOLOGY ROADMAP	60
WATER ENVIRONMENT RESEARCH FOUNDATION	60
WATEREUSE FOUNDATION	61
MWH	62
GLOBAL MARKETS FOR MBR TECHNOLOGY	63
GENERAL ECONOMIC CONSIDERATIONS	63
IMPACT OF THE GLOBALIZED ECONOMY	63
FOREIGN DIRECT INVESTMENT IN WATER/WASTEWATER PROGRAMS	63
The Role of International Organizations in Water/Wastewater Management	64
WORLD ACCESS TO CLEAN WATER AND SANITATION	65
Global Water Supply and Sanitation Assessment	65
TABLE 16 WHO/UNICEF GLOBAL WATER/SANITATION ASSESSMENT	66
Millennium Goals	66
Bellagio Framework	67
Decentralized Treatment Systems	68
TABLE 17 EVALUATION OF MBRS FOR DEVELOPING COUNTRIES	68
TABLE 17 (CONTINUED)	69
MARKET VALUE OF MBR SYSTEMS BY GLOBAL REGION	69
TABLE 18 PROJECTED VALUE OF MBR SYSTEMS BY GLOBAL REGION, THROUGH 2013 (\$ MILLIONS)	70
FIGURE 14 PROJECTED VALUE OF MBR SYSTEMS BY GLOBAL REGION, 1990–2013 (\$ MILLIONS)	70
EUROPE	71
GENERAL ECONOMIC TRENDS	71
Member Countries	71
WATER ISSUES	71
EUROPEAN MBR EXPERIENCE	72
Sewage Treatment Plants	72
Industrial Wastewater Treatment Plants	72
EUROPEAN MBR DEVELOPMENT PROGRAMS	73
Amedeus	73
Eurombra	74
MBR-Train	75
Puratreat	75
THE EUROPEAN MARKET FOR MBRS	76
The European Market for MBRS (Continued)	77
TABLE 19 PROJECTED VALUE OF THE EUROPEAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	78
FIGURE 15 PROJECTED VALUE OF THE EUROPEAN MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	79
OVERVIEW OF THE EUROPEAN MBR EXPERIENCE	79

FIGURE 16 END-USE APPLICATIONS FOR INDUSTRIAL MBRS IN EUROPE BY INDUSTRY, 2005 (NUMBER)	80
COUNTRY ANALYSIS	81
Belgium	81
Current Economic Trends	81
Water Needs	82
MBR Experience	83
France	83
Current Economic Trends	83
Water Needs	84
MBR Experience	84
Germany	85
Current Economic Trends	85
Water Needs	85
Water Needs (Continued)	86
MBR Experience	87
Italy	88
Current Economic Trends	88
Water Needs	88
MBR Experience	89
Spain	89
Current Economic Trends	89
Water Needs	90
MBR Experience	91
The Netherlands	91
Current Economic Trends	91
Water Needs	91
MBR Experience	92
United Kingdom	92
Current Economic Trends	92
Water Needs	93
MBR Experience	93
EASTERN EUROPE	94
Poland	94
Current Economic Trends	94
Water Needs	95
THE ASIA PACIFIC MARKET FOR MBRS	96
TABLE 20 PROJECTED VALUE OF THE ASIA PACIFIC MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	97
FIGURE 17 PROJECTED VALUE OF THE ASIA PACIFIC MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	98
AUSTRALIA	99
Current Economic Trends	99
Water Needs	99
Water Needs (Continued)	100
MBR Experience	101

CHINA	102
Current Economic Trends	102
Water Needs	103
MBR Experience	104
INDIA	104
Current Economic Trends	104
Water Needs	105
Coverage	105
Regulatory	105
Market	106
Players	107
JAPAN	107
Current Economic Trends	107
Water Needs	108
MBR Experience	109
SOUTH KOREA	110
Current Economic Trends	110
Water Needs	111
MBR Experience	112
SINGAPORE	112
Current Economic Trends	112
Water Issues	112
MBR Experience	113
THE MIDDLE EAST/AFRICAN MARKET FOR MBRS	113
TABLE 21 PROJECTED VALUE OF THE MIDDLE EAST/AFRICAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	114
FIGURE 18 PROJECTED VALUE OF THE MIDDLE EAST/AFRICAN MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	115
MIDDLE EAST	115
MIDDLE EAST MBR EXPERIENCE	116
Bahrain	116
Current Economic Trends	116
Water Needs	117
Kuwait	118
Current Economic Trends	118
Water Needs	118
Egypt	119
Current Economic Trends	119
Water Needs	120
Israel	121
Current Economic Trends	121
Water Needs	121
MBR Experience	122
Saudi Arabia	122
Current Economic Trends	122
Water Needs	123

MBR Experience	124
United Arab Emirates	124
Current Economic Trends	124
Water Needs	125
MBR Experience	126
AFRICA	126
MBR Experience	127
THE LATIN AMERICAN/CARIBBEAN MARKET FOR MBRS	127
TABLE 22 PROJECTED VALUE OF THE LATIN AMERICAN/CARIBBEAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	128
FIGURE 19 PROJECTED VALUE OF THE LATIN AMERICAN/CARIBBEAN MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	128
LATIN AMERICA	129
Argentina	130
Current Economic Trends	130
Water Needs	130
MBR Experience	131
Brazil	131
Current Economic Trends	131
Water Needs	132
Ecuador	133
Current Economic Trends	133
Water Needs	133
Mexico	134
Current Economic Trends	135
Water Needs	135
MBR Experience	136
CARIBBEAN	136
Bahamas	137
Current Economic Trends	137
Water Needs	137
Jamaica	138
Current Economic Trends	138
Water Needs	138
Water Needs (Continued)	139
INDUSTRY STRUCTURE	140
CONGLOMERATES	140
WATER/WASTEWATER TREATMENT COMPANIES	141
SPECIALIZED PROVIDERS	141
STRATEGIES FOR REMAINING COMPETITIVE	142
MARKET SHARE	142
TABLE 23 ESTIMATED GLOBAL MBR MARKET SHARE AMONG MARKET LEADERS, 2008 (\$ MILLIONS)	142
FIGURE 20 ESTIMATED GLOBAL MBR MARKET SHARE AMONG MARKET LEADERS, 2008 (%)	143
COMPANY PROFILES	143

A3 WATER SOLUTIONS GMBH	144
A3-USA	144
Projects	144
TABLE 24 A3 REFERENCE PLANTS	145
ASHBROOK SIMON HARTLEY	146
IMAS (Integrated Membrane Activated Sludge) MBR	146
BIWATER INTERNATIONAL, LTD.	147
BRIGHTWATER F.L.I., LTD.	147
BUSSE GMBH	148
Busse-MF Small Size Sewage Treatment Plant	148
Projects	149
CERAMEM	149
MBR	149
COLLOIDE ENGINEERING SYSTEMS	150
ECOTECH FOLEY PIPELINES	150
GE WATER TECHNOLOGIES	151
ZeeWeed MBR	151
Shipboard	152
Projects	152
TABLE 25 GE ZENON REFERENCE PLANTS	152
TABLE 25 (CONTINUED)	153
TABLE 25 (CONTINUED)	154
GROUPE LAPERRIÈRE & VERREAULT, INC.	154
ENVIROQUIP	154
Projects	155
TABLE 26 ENVIROQUIP REFERENCE PLANTS	155
HANS HUBER AG	156
MembraneClearBox	156
VRM Bioreactor	156
BioMem	157
Projects	157
TABLE 27 HUBER REFERENCE PLANTS	157
INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE (ITRI)	157
ITT INDUSTRIES	158
Aquious Water Technologies	158
ITT Dual-Stage MBR	159
KEPPEL CORP.	160
Keppel Seghers Technology Group BV	160
Unibrane Submerged MBR	161
Unibrane Overpressure MBR	161
Unipac	161
Projects	161
TABLE 28 KEPPEL SEGHERS REFERENCE PLANTS	161
KIBARAN TERNAMA SDN. BHD.	162
KOCH MEMBRANE SYSTEMS	162
Koch Membrane Systems GmbH (formerly Puron AG)	162

Puron MBR	163	
Projects	164	
TABLE 29 PURON REFERENCE PLANTS		164
KOLON INDUSTRIES	164	
KUBOTA CORP.	165	
Kubota MBR	165	
Projects	166	
TABLE 30 KUBOTA REFERENCE PLANTS		166
TABLE 30 (CONTINUED)	167	
MARTIN SYSTEMS AG	167	
Projects	167	
MILLENNIUMPORE	168	
MITSUBISHI RAYON CO., LTD.	168	
Mitsubishi MBR	169	
Projects	169	
TABLE 31 MITSUBISHI REFERENCE PLANTS		170
TIANJIN MOTIMO MEMBRANE TECHNOLOGY, LTD.		171
NORIT	171	
Airlift MBR	172	
Projects	172	
NOVASEP GROUP	173	
Orelis MBR	173	
Projects	173	
TABLE 32 ORELIS REFERENCE PLANTS		174
NOVOFLOW GMBH	174	
PALL CORP.	174	
Pall Aria MBR	175	
POLYMEM S.A.	176	
Immem MBR	176	
SAEHAN INDUSTRIES, INC.	177	
SFC UMWELTTECHNIK GMBH	177	
SHAW GROUP	178	
Envirogen, Inc.	178	
Shaw MBR	178	
MTBE Cleanup	179	
SIEMENS AG	179	
MemJet MBR	180	
Petro MBR	180	
Projects	181	
TABLE 33 SIEMENS REFERENCE PLANTS		181
SUEZ ENVIRONNEMENT	181	
Infilco Degremont	182	
BRM MBR	182	
Projects	183	
TORAY INDUSTRIES	183	
Toray MBR	183	

TRIQUA BV	184
Triqua MBRs	184
Projects	184
ULTRA-FLO PTE, LTD.	185
Ultra-Flo MBR	185
VEOLIA ENVIRONNEMENT	186
Veolia Water Solutions & Technologies	186
Biosep MBR	186
Memrod	187
Projects	187
WEHRLE WERK AG	187
Biomembrat MBR	188
Projects	188
TABLE 34 WEHRLE WERK REFERENCE PLANTS	189
APPENDIX	190
TABLE 35 U.S. PATENT SURVEY, JANUARY 29, 1991 TO DECEMBER 18, 2007	190
TABLE 35 (CONTINUED)	191
TABLE 35 (CONTINUED)	192
TABLE 35 (CONTINUED)	193
TABLE 35 (CONTINUED)	194
TABLE 35 (CONTINUED)	195

SUMMARY TABLE GLOBAL MBR MARKET VALUE, THROUGH 2013 (\$ MILLIONS) XXIII

TABLE 1 COMPARISON OF AEROBIC, ANAEROBIC MBRS	7
TABLE 2 PROJECTED GLOBAL VALUE OF MBRS BY TYPE OF MICROBIAL PROCESS, THROUGH 2013 (\$ MILLIONS)	8
TABLE 3 PROJECTED GLOBAL VALUE OF MBRS BY CONFIGURATION, 1990–2013 (\$ MILLIONS)	14
TABLE 4 ADVANTAGES AND DISADVANTAGES OF MBR CONFIGURATIONS	15
TABLE 5 MAJOR MANUFACTURERS OF MBRS AND THEIR PRODUCTS	16
TABLE 6 TECHNOLOGIES USED IN WASTEWATER TREATMENT	19
TABLE 7 CAPITAL AND OPERATING COSTS: MBR VS. ACTIVATED SLUDGE (300,000 GPD)	21
TABLE 8 APPLICATIONS FOR MBR TECHNOLOGY BY WASTEWATER TYPE, 2008 (%)	24
TABLE 9 PROJECTED GLOBAL VALUE OF MBRS BY APPLICATION, THROUGH 2013 (\$ MILLIONS)	28
TABLE 10 TYPICAL CONTAMINANTS IN UNTREATED MUNICIPAL WASTEWATER (MG/L)	29
TABLE 11 POTENTIAL WASTEWATER COMPONENTS BY INDUSTRY	32
TABLE 12 COMPARISON OF SYSTEMS FOR IN-BUILDING WATER RECYCLING	36

TABLE 13 U.S. PATENT SURVEY BY COMPANY, 1991–2007 (NUMBER)	51
TABLE 14 U.S. PATENT SURVEY BY APPLICATION, 1991–2007 (NUMBER)	52
TABLE 15 VALUE OF THE NORTH AMERICAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	54
TABLE 16 WHO/UNICEF GLOBAL WATER/SANITATION ASSESSMENT	66
TABLE 17 EVALUATION OF MBRS FOR DEVELOPING COUNTRIES	68
TABLE 18 PROJECTED VALUE OF MBR SYSTEMS BY GLOBAL REGION, THROUGH 2013 (\$ MILLIONS)	70
TABLE 19 PROJECTED VALUE OF THE EUROPEAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	78
TABLE 20 PROJECTED VALUE OF THE ASIA PACIFIC MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	97
TABLE 21 PROJECTED VALUE OF THE MIDDLE EAST/AFRICAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	114
TABLE 22 PROJECTED VALUE OF THE LATIN AMERICAN/CARIBBEAN MARKET FOR MBRS, THROUGH 2013 (\$ MILLIONS)	128
TABLE 23 ESTIMATED GLOBAL MBR MARKET SHARE AMONG MARKET LEADERS, 2008 (\$ MILLIONS)	142
TABLE 24 A3 REFERENCE PLANTS	145
TABLE 25 GE ZENON REFERENCE PLANTS	152
TABLE 26 ENVIROQUIP REFERENCE PLANTS	155
TABLE 27 HUBER REFERENCE PLANTS	157
TABLE 28 KEPPEL SEGHERS REFERENCE PLANTS	161
TABLE 29 PURON REFERENCE PLANTS	164
TABLE 30 KUBOTA REFERENCE PLANTS	166
TABLE 31 MITSUBISHI REFERENCE PLANTS	170
TABLE 32 ORELIS REFERENCE PLANTS	174
TABLE 33 SIEMENS REFERENCE PLANTS	181
TABLE 34 WEHRLE WERK REFERENCE PLANTS	189
TABLE 35 U.S PATENT SURVEY, JANUARY 29, 1991 TO DECEMBER 18, 2007	190

SUMMARY FIGURE GLOBAL MBR MARKET VALUE, 1990–2013 (\$ MILLIONS) XXIII

FIGURE 1 GLOBAL FRESH WATER STRESS, 1995 AND FORECAST FOR 2025	3
FIGURE 2 PROJECTED GLOBAL VALUE OF MBRS BY TYPE OF MICROBIAL PROCESS, 1990–2013 (\$ MILLIONS)	8
FIGURE 3 SCHEMATIC OF SUBMERGED MEMBRANE BIOREACTOR	12
FIGURE 4 SCHEMATIC OF EXTERNAL MEMBRANE BIOREACTOR	13
FIGURE 5 PROJECTED GLOBAL VALUE OF MBRS BY CONFIGURATION, 1990–2013 (\$ MILLIONS)	14

FIGURE 6 CAPITAL COSTS: MBR VS. ACTIVATED SLUDGE (300,000 GPD)	
22	
FIGURE 7 OPERATING COSTS: MBR VS. ACTIVATED SLUDGE	23
FIGURE 8 APPLICATIONS FOR MBR TECHNOLOGY BY NUMBER OF INSTALLED SYSTEMS, 2008 (%)	25
FIGURE 9 PROJECTED GLOBAL VALUE OF MBRS BY APPLICATION, 1990– 2013 (\$ MILLIONS)	28
FIGURE 10 U.S. PATENT SURVEY BY COMPANY, 1991–2007 (%)	51
FIGURE 11 PATENT SURVEY BY APPLICATION, 1991–2007 (%)	52
FIGURE 12 VALUE OF THE NORTH AMERICAN MARKET FOR MBRS, 1990– 2013 (\$ MILLIONS)	55
FIGURE 13 NORTH AMERICAN INDUSTRIAL MBR INSTALLATIONS BY INDUSTRY, 2006 (NUMBER)	59
FIGURE 14 PROJECTED VALUE OF MBR SYSTEMS BY GLOBAL REGION, 1990–2013 (\$ MILLIONS)	70
FIGURE 15 PROJECTED VALUE OF THE EUROPEAN MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	79
FIGURE 16 END-USE APPLICATIONS FOR INDUSTRIAL MBRS IN EUROPE BY INDUSTRY, 2005 (NUMBER)	80
FIGURE 17 PROJECTED VALUE OF THE ASIA PACIFIC MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	98
FIGURE 18 PROJECTED VALUE OF THE MIDDLE EAST/AFRICAN MARKET FOR MBRS, 1990–2013 (\$ MILLIONS)	115
FIGURE 19 PROJECTED VALUE OF THE LATIN AMERICAN/CARIBBEAN MARKET FOR MBRS, 1990–2013	(\$ MILLIONS) 128
FIGURE 20 ESTIMATED GLOBAL MBR MARKET SHARE AMONG MARKET LEADERS, 2008 (%)	143