

# OZONE GENERATION: TECHNOLOGIES, MARKETS AND PLAYERS



CHM044E  
June 2015

Nana Lapham  
*Project Analyst*

ISBN: 1-62296-101-3



**BCC Research**  
49 Walnut Park, Building 2  
Wellesley, MA 02481 USA  
866-285-7215 (toll-free within the USA),  
or (+1) 781-489-7301  
[www.bccresearch.com](http://www.bccresearch.com)  
[information@bccresearch.com](mailto:information@bccresearch.com)

## TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 INTRODUCTION	2
STUDY GOALS AND OBJECTIVES	2
REASONS FOR DOING THE STUDY	2
INTENDED AUDIENCE	2
SCOPE OF REPORT	3
INFORMATION SOURCES	3
ANALYST'S CREDENTIALS	3
RELATED BCC RESEARCH REPORTS	4
BCC RESEARCH WEBSITE	4
DISCLAIMER	4
CHAPTER 2 SUMMARY	6
OZONE GENERATION TECHNOLOGY MARKET OVERVIEW	6
<i>SUMMARY TABLE GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	6
<i>SUMMARY FIGURE GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	6
OZONE GENERATION TECHNOLOGY APPLICATIONS	7
HIGHER OZONE GENERATION TECHNOLOGY DEMAND	9
DECREASING THE NEED FOR HARSH CHEMICALS	9
AIR POLLUTION	9
CHAPTER 3 OVERVIEW OF OZONE	11
OZONE	11
<i>TABLE 1 OZONE PROPERTIES</i>	11
OZONE LIFESPAN	12
<i>TABLE 2 OZONE HALF LIFE IN AIR BY TEMPERATURE (°C)</i>	12
<i>TABLE 3 OZONE HALF LIFE IN WATER, BY TEMPERATURE (DEGREE C/MINUTES)</i>	12
OZONE GENERATION TECHNOLOGY HISTORY	13
ENVIRONMENTAL CONCERNS REGARDING ATMOSPHERIC OZONE	15
OZONE AND CONTAMINANTS	15
OZONE GENERATION TECHNOLOGY METHODS	18
CORONA DISCHARGE	18
ULTRAVIOLET	19
ELECTROLYSIS	19
COLD PLASMA	20
ADVANCED OXIDATION PROCESSES	20
OZONE GENERATION TECHNOLOGY APPLICATIONS	20
OZONE IN WATER APPLICATIONS	22
Potable Water	22
Municipal	22
Bottled Water	22
Residential	23
Wastewater	23
Municipal	23
Industrial	23

<b>TOPIC</b>	<b>PAGE NO.</b>
Process Water	24
Paper and Pulp	24
Fruits and Vegetables	24
<i>TABLE 4 PRODUCE WASHED WITH OZONE</i>	24
Meat, Poultry and Fish	25
Wineries	25
Pharmaceutical	26
Electric Power Plants	26
Cooling Towers	26
Semiconductor	26
Other Water	27
Swimming Pools, Spas and Hot Tubs	27
Aquaculture	27
Agriculture	27
Ballast Water	28
Commercial Laundry	28
Groundwater and Soil Remediation	28
Homeland Security	28
Small Domestic Use	29
OZONE IN AIR AND GAS	29
Semiconductor Manufacturing	29
Other Air and Gas Treatment	29
Perishable Food Storage	29
Indoor Air Purification and Odor Control	29
<i>TABLE 5 MALODOROUS SUBSTANCES AND ODOR THRESHOLDS</i>	30
Curing Meat	32
OZONE IN MEDICINE	32
CHAPTER 4 MARKET GROWTH FACTORS	34
HIGHER OZONE GENERATION TECHNOLOGY DEMAND	34
<i>TABLE 6 GLOBAL POPULATION AND PERCENTAGE POPULATION GROWTH, 1950-2014 (%)</i>	34
<i>TABLE 7 GLOBAL POPULATION AND PERCENTAGE POPULATION GROWTH PROJECTION, 2014-2100 (%)</i>	34
POPULATION SHIFTS GUIDE OZONE GENERATION TECHNOLOGY MARKET	35
<i>TABLE 8 URBAN POPULATION AND RATE OF URBANIZATION BY COUNTRY 2011-2015 (%)</i>	35
INCREASING GLOBAL WATER CONSUMPTION AND OZONE GENERATION TECHNOLOGY DEMAND	36
<i>TABLE 9 WATER USAGE BY COUNTRY (CUBIC KILOMETERS PER YEAR)</i>	37
FRESHWATER DEPLETION AND THE NEED FOR WATER PURIFICATION	38
WATER SCARCITY AND STRESS AND THE INCREASE IN WATER PURIFICATION NEEDS	38
<i>TABLE 10 TOP 20 COUNTRIES UNDER MOST STRESS, 2000 (% OF LAND AREA UNDER STRESS)</i>	39
<i>TABLE 11 WATER STRESS BY COUNTRY, 2000 (% OF LAND AREA UNDER STRESS)</i>	40
<i>FIGURE 1 FRESHWATER STRESS, 1995-2025</i>	41
<i>TABLE 12 WATER WITHDRAWAL AND RENEWAL BY COUNTRY, THROUGH 2014 (BILLION CUBIC METER/%)</i>	41

TOPIC	PAGE NO.
CLIMATE CHANGE, DROUGHT AND THE OZONE GENERATION TECHNOLOGY MARKET	42
SOCIAL UNREST AND WAR IN RELATION TO OZONE GENERATION TECHNOLOGY POSSIBILITIES	43
POLLUTION	44
<i>TABLE 13 FRESHWATER POLLUTED COUNTRIES, 2001 (METRIC TONS)</i>	45
AIR POLLUTION	45
<i>TABLE 14 DEATHS ATTRIBUTABLE TO AIR POLLUTION, 2012</i>	46
OZONE GENERATION TECHNOLOGIES AND GLOBAL WEALTH	46
INCREASING LEVELS OF INDUSTRIALIZATION	47
<i>TABLE 15 TOP 20 COUNTRIES BY INDUSTRIAL PRODUCTION GROWTH, 2012 (%)</i>	47
NATURAL DISASTERS	48
AMBIANCE AND PRODUCTIVITY IN WORK ENVIRONMENTS	48
DECREASING THE NEED FOR HARSH CHEMICALS	49
BOTTLED WATER MARKET GROWTH AND THE OZONE GENERATION INDUSTRY	49
<i>TABLE 16 TOP 10 COUNTRIES' BOTTLED WATER CONSUMPTION PER CAPITA, 2008 AND 2013 (GALLONS/%)</i>	50
POSSIBLE ECONOMIC BENEFITS OF OZONE ADDITION	50
PAST INCONSISTENCIES WITHIN THE OZONE GENERATION TECHNOLOGY INDUSTRY	51
COMPETING TECHNOLOGIES	52
COMPETING WATER AND WASTEWATER TREATMENT METHODS	53
Chlorine	53
Other Chemical Additives	54
Ultraviolet Irradiation	54
INDOOR AIR TREATMENT	54
Membrane Filtration	54
Mechanical Filtration	54
High-Efficiency Particle Arresting	54
Ultra-Low Penetrating Air	55
Ultraviolet Light	55
Ion Generation	55
Electronic Units	55
Adsorbents	55
COST CONSIDERATIONS FOR WATER AND WASTEWATER TREATMENT	55
<i>TABLE 17 WATER TREATMENT CAPITAL COSTS BY TECHNOLOGY TYPE AND PLANT SIZE (AVERAGE \$/GALLON)</i>	56
OZONE TECHNOLOGY USES FOR MARKET HEALTH	56
AVAILABILITY OF TRAINED STAFF	57
SUCCESSFUL PROJECTS	58
U.S. RIDDLED WITH OZONE INSTALLATIONS	60
<i>TABLE 18 U.S. EXISTING AND PROPOSED OZONE INSTALLATIONS BY YEAR, LOCATION, MANUFACTURER AND CAPACITY, 1940-2014 (1 MGD AND LARGER)</i>	61
OZONE THERAPY TO COMBAT ILLNESS	69
MEDIA SAFETY CONCERNS OVER OZONE	70
<i>TABLE 19 OZONE SAFETY LEVELS (PPM)</i>	71
OZONE SAFETY MEASURES	71
ELECTROCHEMICAL OZONE SENSORS	72
HEATED METAL OXIDE SEMICONDUCTOR SENSORS	72

<b>TOPIC</b>	<b>PAGE NO.</b>
ULTRAVIOLET ABSORPTION SENSOR	72
BADGES AND STRIPS	72
CHEMICAL DETECTION WITH POTASSIUM IODIDE	73
SOAP AND WATER	73
NEW TECHNOLOGIES THAT COMBAT HIGH COSTS ASSOCIATED WITH OZONE GENERATION TECHNOLOGIES	73
OZONE GENERATION TECHNOLOGY AND FOOD SECURITY AND SAFETY ISSUES	74
SEMICONDUCTOR INDUSTRY UPS AND DOWNS AFFECTING THE OZONE GENERATION TECHNOLOGY MARKET	75
OZONE GENERATION TECHNOLOGY AND ENDOCRINE DISRUPTING COMPOUNDS	75
WATER CONTAMINATION INCIDENTS AND OZONE GENERATION TECHNOLOGY	76
WATER RECYCLING AND REUSE MARKET SPURRING GROWTH OF THE OZONE GENERATION TECHNOLOGY MARKET	76
STRICTER REGULATORY ENVIRONMENT FOR WATER AND OZONE GENERATION TECHNOLOGY GROWTH	78
REGULATORY LAGS EFFECT ON THE MARKET	79
CHAPTER 5 OZONE TECHNOLOGY MARKETS: METHODS AND APPLICATIONS	82
OZONE GENERATION TECHNOLOGY MARKET	82
<i>TABLE 20 GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY MAJOR APPLICATION CATEGORIES, THROUGH 2020 (\$ MILLIONS)</i>	82
<i>FIGURE 2 GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY MAJOR APPLICATION CATEGORIES, 2014-2020 (\$ MILLIONS)</i>	82
WATER APPLICATIONS	83
<i>TABLE 21 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WATER APPLICATIONS MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	83
<i>FIGURE 3 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WATER APPLICATIONS MARKET, 2014-2020 (\$ MILLIONS)</i>	84
POTABLE WATER	84
<i>TABLE 22 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	84
<i>FIGURE 4 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	84
Potable Water Segments	85
Potable Water Market by Segment	85
<i>TABLE 23 GLOBAL OZONE TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	86
<i>FIGURE 5 GLOBAL OZONE TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET BY TYPE, 2014-2020 (\$ MILLIONS)</i>	86
<i>TABLE 24 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN POTABLE WATER TREATMENT BY TYPE, 2015 (%)</i>	86
<i>FIGURE 6 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN POTABLE WATER TREATMENT BY TYPE, 2015 (\$ MILLIONS)</i>	87
Municipal Potable Water Treatment	87
Dispersing the Gas	88
Ozone with Hydrogen Peroxide	89
Drawbacks and Benefits	89
Ozone's advantages in potable water treatment include:	89
Disadvantages include:	89

<b>TOPIC</b>	<b>PAGE NO.</b>
Municipal Potable Water Treatment	90
<i>TABLE 25 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	90
<i>FIGURE 7 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL POTABLE WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	90
Bottled Potable Water Treatment	91
Bottled Potable Water Market by Segment	91
<i>TABLE 26 GLOBAL OZONE GENERATION TECHNOLOGY IN THE BOTTLED POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	92
<i>FIGURE 8 GLOBAL OZONE GENERATION TECHNOLOGY IN THE BOTTLED POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS)</i>	92
Residential Potable Water Sub-Segment	92
Residential Potable Water	93
<i>TABLE 27 GLOBAL OZONE GENERATION TECHNOLOGY IN THE RESIDENTIAL POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	93
<i>FIGURE 9 GLOBAL OZONE GENERATION TECHNOLOGY IN THE RESIDENTIAL POTABLE WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	93
WASTEWATER	94
Sludge Management	95
Wastewater Treatment	96
<i>TABLE 28 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	96
<i>FIGURE 10 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS)</i>	96
Wastewater Segments	97
<i>TABLE 29 GLOBAL OZONE TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET BY SEGMENT, THROUGH 2020 (\$ MILLIONS)</i>	97
<i>FIGURE 11 GLOBAL OZONE TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET BY SEGMENT, 2014-2020 (\$ MILLIONS)</i>	97
<i>TABLE 30 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN WASTEWATER TREATMENT BY SEGMENT, 2015 (%)</i>	98
<i>FIGURE 12 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY, IN WASTEWATER TREATMENT BY SEGMENT, 2015 (%)</i>	98
Industrial Wastewater	99
Color Removal	100
Cyanide and Heavy Metals	100
Goldox Process	101
Industrial Wastewater Market	102
<i>TABLE 31 GLOBAL OZONE GENERATION TECHNOLOGY IN THE INDUSTRIAL WASTEWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	102
<i>FIGURE 13 GLOBAL OZONE GENERATION TECHNOLOGY IN THE INDUSTRIALWASTEWATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	102
Municipal Wastewater	103
<i>TABLE 32 INFECTIOUS AGENTS POTENTIALLY PRESENT IN DOMESTIC WASTEWATER</i>	103
Municipal Wastewater Market	103
<i>TABLE 33 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL WASTEWATER MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	104
<i>FIGURE 14 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL WASTEWATER MARKET, 2014-2020 (\$ MILLIONS)</i>	104
PROCESS WATER	104

<b>TOPIC</b>	<b>PAGE NO.</b>
Pulp and Paper	105
Kraft Process	105
Chlorine-Free Bleaching	105
Elemental Chlorine-Free Versus Totally Chlorine-Free	106
Ozone Bleaching Process	106
Food and Beverage	107
<i>TABLE 34 OZONE APPLICATIONS IN THE FOOD PROCESSING INDUSTRY</i>	108
Fruits and Vegetables	109
<i>TABLE 35 PRODUCE WASHED COMMERCIALY WITH OZONATED WATER</i>	109
Meat, Poultry and Seafood	110
Meat	110
Poultry	110
Seafood	110
Commercial Fishing Vessels	110
Seafood Processing	111
Wine	111
<i>TABLE 36 OZONE APPLICATIONS IN THE WINE INDUSTRY</i>	112
Commercial Food Service Operations	112
Benefits and Drawbacks of Ozone in Food Processing	112
Equipment Sanitizing	113
Hard Surface Sanitizing	113
Sanitizing Packaging Material	113
Semiconductor Manufacturing	114
<i>TABLE 37 TYPICAL ULTRAPURE SEMICONDUCTOR WATER STANDARDS</i>	115
Wafer Cleaning	115
Other Process Water Applications	116
Pharmaceuticals Production	116
Sterile Makeup Water	116
Cooling Water Treatment	117
Ozonation of Cooling Water	117
Controlling Macrofoulants	118
Legionella	118
Clean-In-Place Systems	119
Process Wastewater Market	120
<i>TABLE 38 GLOBAL OZONE GENERATION TECHNOLOGY IN THE PROCESS WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	120
<i>FIGURE 15 global Ozone Generation Technology in the Process Water treatment market, 2014-2020 (\$ Millions)</i>	120
OTHER WATER	121
Other Water Market	121
<i>TABLE 39 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	122
<i>FIGURE 16 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	122
Other Water Segments	122
<i>TABLE 40 GLOBAL OZONE TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET BY SEGMENT, THROUGH 2020 (\$ MILLIONS)</i>	123
<i>FIGURE 17 GLOBAL OZONE TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET BY SEGMENT, 2014-2020 (\$ MILLIONS)</i>	123

<b>TOPIC</b>	<b>PAGE NO.</b>
<i>TABLE 41 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN OTHER WATER TREATMENT BY SEGMENT, 2015 (%)</i>	124
<i>FIGURE 18 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN OTHER WATER TREATMENT BY SEGMENT, 2015 (%)</i>	124
Pool and Spa	124
Choosing Ozone Systems for Pools and Spas	126
Pool and Spa Market	126
<i>TABLE 42 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POOL AND SPA WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	126
<i>FIGURE 19 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POOL AND SPA WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	126
Aquaculture	127
Aquaculture Market	128
<i>TABLE 43 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AQUACULTURE MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	128
<i>FIGURE 20 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AQUACULTURE MARKET, 2014-2020 (\$ MILLIONS)</i>	128
Remaining Applications	129
Agriculture	129
Livestock Water	129
Hydroponics	130
Ballast Water	130
Stormwater Runoff and Rainwater Harvesting	131
Environmental Cleanup	131
Landfill Leachate	131
Groundwater and Soil Remediation	132
<i>TABLE 44 GROUNDWATER CONTAMINANTS SUSCEPTIBLE TO OZONE</i>	133
Impaired Water Bodies	133
Laundry	133
Cost	134
<i>TABLE 45 OZONE AND CONVENTIONAL LAUNDRY CYCLE COST COMPARISON</i>	134
Household Appliances and Personal Care Products	135
Facial Steamers	135
Foot Baths	135
Oral Care Systems	136
Residential Surface Sanitizers	136
Contact Lens Cleaners	136
Footwear and Apparel Deodorizers	136
Homeland Security	137
Remaining Applications	137
<i>TABLE 46 GLOBAL OZONE GENERATION TECHNOLOGY IN THE REMAINING WATER APPLICATIONS MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	138
<i>FIGURE 21 GLOBAL OZONE GENERATION TECHNOLOGY IN THE REMAINING WATER APPLICATIONS MARKET, 2014-2020 (\$ MILLIONS)</i>	138
AIR AND GAS TREATMENT	138
<i>TABLE 47 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	139
<i>FIGURE 22 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET, 2014-2020 (\$ MILLIONS)</i>	139



<b>TOPIC</b>	<b>PAGE NO.</b>
AIR AND GAS TREATMENT SEGMENTS	139
<i>TABLE 48 GLOBAL OZONE TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET BY SEGMENT, THROUGH 2020 (\$ MILLIONS)</i>	139
<i>FIGURE 23 GLOBAL OZONE TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET BY SEGMENT, 2014-2020 (\$ MILLIONS)</i>	140
<i>TABLE 49 GLOBAL MARKET SHARE FOR OZONE TECHNOLOGY IN AIR AND GAS TREATMENT BY SEGMENT, 2015 (%)</i>	141
<i>FIGURE 24 GLOBAL MARKET SHARE FOR OZONE TECHNOLOGY IN AIR AND GAS TREATMENT BY SEGMENT, 2015 (%)</i>	141
SEMICONDUCTOR	141
Wafer Cleaning	142
Ozone-Assisted Layer Deposition	142
Chemical Vapor Deposition	142
Atomic Layer Deposition	143
Semiconductor	143
<i>TABLE 50 GLOBAL OZONE GENERATION TECHNOLOGY IN THE SEMICONDUCTOR APPLICATIONS MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	143
<i>FIGURE 25 GLOBAL OZONE GENERATION TECHNOLOGY IN THE SEMICONDUCTOR APPLICATIONS MARKET, 2014-2020 (\$ MILLIONS)</i>	143
OTHER AIR AND GAS TREATMENT SEGMENT	144
Air Treatment and Odor Control	144
Dosages	145
<i>TABLE 51 TYPICAL INDUSTRIAL ODOR CONTROL DOSAGES (PPM)</i>	145
Mold and Smoke Remediation	146
FOOD STORAGE	146
Produce	147
Meat	147
Meat Curing	147
Crop Pretreatment and Fumigation	148
Seed Treatment	148
Exhaust Gases	148
<i>TABLE 52 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER AIR AND GAS TREATMENTS MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	149
<i>FIGURE 26 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER AIR AND GAS TREATMENTS MARKET, 2014-2020 (\$ MILLIONS)</i>	149
MEDICINE	150
GENERATING MEDICAL OZONE	150
Medical Ozone Uses	150
<i>TABLE 53 THERAPEUTIC OZONE USES</i>	151
Bactericidal, Virucidal and Fungicidal Action	151
Cancer Therapy	151
AIDS Treatment	152
Ebola Treatment	152
Prion Inactivation	152
Dentistry	153
Veterinary Medicine	153
<i>TABLE 54 VETERINARY OZONE THERAPY APPLICATIONS</i>	153
MEDICAL OZONE APPLICATIONS	154
Systemic Ozone Treatment	154

<b>TOPIC</b>	<b>PAGE NO.</b>
Topical Ozone Treatment	154
Ozone Gas	154
Ozonated Water	155
Ozonated Ointments	155
<i>TABLE 55 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MEDICINE MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	155
<i>FIGURE 27 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MEDICINE MARKET, 2014-2020 (\$ MILLIONS)</i>	155
CHAPTER 6 REGIONAL OZONE TECHNOLOGY MARKETS	158
REGIONAL MARKETS	158
REGIONAL MARKET BREAKDOWNS	158
<i>TABLE 56 GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY REGION, 2020 (\$ MILLIONS)</i>	158
<i>TABLE 57 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY BY REGION, 2015 (%)</i>	159
<i>FIGURE 28 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY BY REGION, 2015 (%)</i>	159
Asia	159
<i>TABLE 58 ASIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	160
<i>FIGURE 29 ASIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	160
North America	160
<i>TABLE 59 NORTH AMERICAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	161
<i>FIGURE 30 NORTH AMERICA OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	161
Europe	161
<i>TABLE 60 EUROPEAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	162
<i>FIGURE 31 EUROPEAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	162
Middle East	162
<i>TABLE 61 MIDDLE EASTERN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	163
<i>FIGURE 32 MIDDLE EASTERN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	163
Latin America and Caribbean	163
<i>TABLE 62 LATIN AMERICAN AND CARIBBEAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	164
<i>FIGURE 33 LATIN AMERICAN AND CARIBBEAN MARKET FOR OZONE GENERATION TECHNOLOGY, 2014-2020 (\$ MILLIONS)</i>	164
Africa	164
<i>TABLE 63 AFRICAN OZONE GENERATION TECHNOLOGY MARKET, 2020 (\$ MILLIONS/%)</i>	165
<i>FIGURE 34 AFRICAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	165
Australia and Oceania	165
<i>TABLE 64 AUSTRALIAN AND OCEANIA OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	166

<b>TOPIC</b>	<b>PAGE NO.</b>
<i>FIGURE 35 AUSTRALIAN AND OCEANIA OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	166
U.S.	166
<i>TABLE 65 U.S. MARKET FOR OZONE GENERATION TECHNOLOGY, THROUGH 2020 (\$ MILLIONS/%)</i>	167
<i>FIGURE 36 U.S. OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	167
<i>TABLE 66 U.S. OZONE GENERATION TECHNOLOGY MARKET BY REGION, 2015 (\$ MILLIONS)</i>	167
<i>FIGURE 37 U.S. MARKET SHARE FOR OZONE GENERATION TECHNOLOGY BY REGION, 2015 (%)</i>	168
CHINA	168
<i>TABLE 67 CHINESE OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	169
<i>FIGURE 38 CHINESE OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	169
JAPAN	169
<i>TABLE 68 JAPANESE OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	170
<i>FIGURE 39 JAPANESE OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	170
INDIA	170
<i>TABLE 69 INDIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	171
<i>FIGURE 40 INDIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	171
GERMANY	171
<i>TABLE 70 GERMAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	172
<i>FIGURE 41 GERMAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	172
CANADA	172
<i>TABLE 71 CANADIAN OZONE GENERATION TECHNOLOGY, THROUGH 2020 (\$ MILLIONS/%)</i>	172
<i>FIGURE 42 CANADIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	173
<i>TABLE 72 CANADIAN OZONE GENERATION TECHNOLOGY MARKET, BY REGION, 2015 (%)</i>	173
<i>FIGURE 43 CANADIAN OZONE GENERATION TECHNOLOGY MARKET BY REGION, 2015 (%)</i>	174
U.K.	174
<i>TABLE 73 U.K. OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS)</i>	175
<i>FIGURE 44 U.K. OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	175
FRANCE	175
<i>TABLE 74 FRENCH OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	176
<i>FIGURE 45 FRENCH OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	176
RUSSIA	176

<b>TOPIC</b>	<b>PAGE NO.</b>
<i>TABLE 75 RUSSIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	177
<i>FIGURE 46 RUSSIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	177
BRAZIL	177
<i>TABLE 76 BRAZILIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)</i>	178
<i>FIGURE 47 BRAZILIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)</i>	178
CHAPTER 7 PATENTS AND TECHNOLOGIES	180
GLOBAL PATENTS	180
<i>TABLE 77 GRANTED PATENTS BY REGION, 2004-2014 (NUMBER OF PATENTS)</i>	180
<i>FIGURE 48 PATENTS GRANTED BY REGION, 2004-2014 (NUMBER OF PATENTS)</i>	180
U.S. PATENTS	181
<i>TABLE 78 U.S. PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014</i>	181
<i>TABLE 79 U.S. PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013</i>	184
<i>TABLE 80 U.S. PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2012</i>	188
EUROPEAN PATENTS	192
<i>TABLE 81 EUROPEAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014</i>	192
<i>TABLE 82 EUROPEAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013</i>	194
<i>TABLE 83 EUROPEAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2012</i>	197
CANADIAN PATENTS	199
<i>TABLE 84 CANADIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014</i>	199
<i>TABLE 85 CANADIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013</i>	200
<i>TABLE 86 CANADIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2012</i>	201
AUSTRALIAN PATENTS	202
<i>TABLE 87 AUSTRALIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014</i>	202
<i>TABLE 88 AUSTRALIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013</i>	202
PRIMOZONE'S IMPROVEMENT ON COLD PLASMA OZONE GENERATION	202
OZONE NANO-BUBBLES OF THE FUTURE	202
ROSE TECHNOLOGY AND REMOTE CONTROL OPERATION	203
HOUSEHOLD OZONE SPRAY	203
OZONE TO DEGRADE AFLATOXIN	203
XYLEM'S ADVANCED OXIDATION PROCESS	203
ECOSPHERE FRACKS WITH OZONE	204
OZOMAX TARGETS SURVIVAL MARKETS	204
CHAPTER 8 COMPANY PROFILES	206
LARGE AND SMALL COMPANIES IN THE OZONE GENERATION TECHNOLOGY MARKET	206
A2Z OZONE INC.	206
ABSOLUTE SYSTEMS INC.	207
AIR TREE OZONE TECHNOLOGY CO. LTD.	207

<b>TOPIC</b>	<b>PAGE NO.</b>
AIR-ZONE INC.	208
ALAB LLC	208
AQUA-SUN OZONE INTERNATIONAL INC.	209
ARGENTOX OZONE TECHNOLOGY GMBH	209
BIOZONE CORP.	210
BWT AKTIENGESELLSCHAFT	210
CHEMTRONICS	211
CLEARWATER TECH LLC	211
CREATIVE OZ-AIR (I) PVT. LTD.	212
CUROZONE USA INC.	212
DEL OZONE HOLDING COMPANY INC.	213
EBARA CORP.	213
ECO SAFE SYSTEMS USA INC.	214
ELECTROLYTIC OZONE INC.	215
ENVIRORENTAL PRODUCTS LTD.	215
ENVRON ENVIRONMENTAL LTD.	216
ESCO INTERNATIONAL	217
FARADAY INSTRUMENTS	217
FINNEGAN-REZTEK	218
GREENWAY WATER TECHNOLOGIES	218
GUARDIAN MANUFACTURING INC.	219
HANGZHOU RONGXIN ELECTRONIC EQUIPMENT CO. LTD.	220
HELLENBRAND INC.	220
IN USA INC.	220
INTERNATIONAL OZONE TECHNOLOGIES GROUP INC.	221
JENESCO INC.	221
KAUFMANN UMWELTTECHNIK GMBH & CO.KG	222
LENNTECH B.V.	223
LIFETECH SRO	223
LONGEVITY RESOURCES INC.	224
MAZZEI INJECTOR COMPANY LLC	224
MEDIZONE INTERNATIONAL INC.	225
MEDOZONS LTD.	225
METAWATER USA INC.	226
MITSUBISHI ELECTRIC CORP.	227
MKS INSTRUMENTS INC.	228
NORLAND INTERNATIONAL INC.	228
NUTEK INTERNATIONAL INC.	229
OZOCAN CORP.	229
OZOMAX INC.	230
OZONE SERVICES INDUSTRIES PTY LTD	230
OZONE SOLUTIONS INC.	231
OZONE TECH SYSTEMS OTS AB	231
OZONE WATER SYSTEMS INC.	232
OZONIA	232
OZONO ELETTRONICA INTERNAZIONALE SRL	233
OZONOLOGY INC.	234

<b>TOPIC</b>	<b>PAGE NO.</b>
PACIFIC OZONE TECHNOLOGY INC.	235
PINNACLE OZONE SOLUTIONS LLC	235
PROMINENT DOSIERTECHNIK GMBH	236
PROMOLIFE INC.	236
PRIMOZONE PRODUCTION AB	237
PURFRESH INC.	237
QINGDAO GUOLIN INDUSTRY CO. LTD.	238
RES REMEDIATION SERVICES	238
RGF ENVIRONMENTAL GROUP INC.	239
SASAKURA ENGINEERING CO. LTD.	240
TRIOGEN LTD.	240
TRIWIN WATERTEC CO. LTD.	241
VEK ENVIRONMENTAL LTD.	241
WASSERTEC OZONE SYSTEMS	242
WELLTECH PACIFIC OZONE LTD.	243
XYLEM INC.	243
ZUVO WATER LLC	245

**LIST OF TABLES**

<b>TABLE HEADING</b>	<b>PAGE NO.</b>
SUMMARY TABLE GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	6
TABLE 1 OZONE PROPERTIES	11
TABLE 2 OZONE HALF LIFE IN AIR BY TEMPERATURE (°C)	12
TABLE 3 OZONE HALF LIFE IN WATER, BY TEMPERATURE (DEGREE C/MINUTES)	12
TABLE 4 PRODUCE WASHED WITH OZONE	24
TABLE 5 MALODOROUS SUBSTANCES AND ODOR THRESHOLDS	30
TABLE 6 GLOBAL POPULATION AND PERCENTAGE POPULATION GROWTH, 1950-2014 (%)	34
TABLE 7 GLOBAL POPULATION AND PERCENTAGE POPULATION GROWTH PROJECTION, 2014-2100 (%)	34
TABLE 8 URBAN POPULATION AND RATE OF URBANIZATION BY COUNTRY 2011-2015 (%)	35
TABLE 9 WATER USAGE BY COUNTRY (CUBIC KILOMETERS PER YEAR)	37
TABLE 10 TOP 20 COUNTRIES UNDER MOST STRESS, 2000 (% OF LAND AREA UNDER STRESS)	39
TABLE 11 WATER STRESS BY COUNTRY, 2000 (% OF LAND AREA UNDER STRESS)	40
TABLE 12 WATER WITHDRAWAL AND RENEWAL BY COUNTRY, THROUGH 2014 (BILLION CUBIC METER/%)	41
TABLE 13 FRESHWATER POLLUTED COUNTRIES, 2001 (METRIC TONS)	45
TABLE 14 DEATHS ATTRIBUTABLE TO AIR POLLUTION, 2012	46
TABLE 15 TOP 20 COUNTRIES BY INDUSTRIAL PRODUCTION GROWTH, 2012 (%)	47
TABLE 16 TOP 10 COUNTRIES' BOTTLED WATER CONSUMPTION PER CAPITA, 2008 AND 2013 (GALLONS/%)	50
TABLE 17 WATER TREATMENT CAPITAL COSTS BY TECHNOLOGY TYPE AND PLANT SIZE (AVERAGE \$/GALLON)	56
TABLE 18 U.S. EXISTING AND PROPOSED OZONE INSTALLATIONS BY YEAR, LOCATION, MANUFACTURER AND CAPACITY, 1940-2014 (1 MGD AND LARGER)	61
TABLE 19 OZONE SAFETY LEVELS (PPM)	71
TABLE 20 GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY MAJOR APPLICATION CATEGORIES, THROUGH 2020 (\$ MILLIONS)	82
TABLE 21 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WATER APPLICATIONS MARKET, THROUGH 2020 (\$ MILLIONS/%)	83
TABLE 22 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	84
TABLE 23 GLOBAL OZONE TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET BY TYPE, THROUGH 2020 (\$ MILLIONS)	86
TABLE 24 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN POTABLE WATER TREATMENT BY TYPE, 2015 (%)	86
TABLE 25 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	90
TABLE 26 GLOBAL OZONE GENERATION TECHNOLOGY IN THE BOTTLED POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	92
TABLE 27 GLOBAL OZONE GENERATION TECHNOLOGY IN THE RESIDENTIAL POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	93
TABLE 28 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	96
TABLE 29 GLOBAL OZONE TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET BY SEGMENT, THROUGH 2020 (\$ MILLIONS)	97

<b>TABLE HEADING</b>	<b>PAGE NO.</b>
TABLE 30 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN WASTEWATER TREATMENT BY SEGMENT, 2015 (%)	98
TABLE 31 GLOBAL OZONE GENERATION TECHNOLOGY IN THE INDUSTRIAL WASTEWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	102
TABLE 32 INFECTIOUS AGENTS POTENTIALLY PRESENT IN DOMESTIC WASTEWATER	103
TABLE 33 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL WASTEWATER MARKET, THROUGH 2020 (\$ MILLIONS/%)	104
TABLE 34 OZONE APPLICATIONS IN THE FOOD PROCESSING INDUSTRY	108
TABLE 35 PRODUCE WASHED COMMERCIALY WITH OZONATED WATER	109
TABLE 36 OZONE APPLICATIONS IN THE WINE INDUSTRY	112
TABLE 37 TYPICAL ULTRAPURE SEMICONDUCTOR WATER STANDARDS	115
TABLE 38 GLOBAL OZONE GENERATION TECHNOLOGY IN THE PROCESS WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	120
TABLE 39 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	122
TABLE 40 GLOBAL OZONE TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET BY SEGMENT, THROUGH 2020 (\$ MILLIONS)	123
TABLE 41 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN OTHER WATER TREATMENT BY SEGMENT, 2015 (%)	124
TABLE 42 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POOL AND SPAWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	126
TABLE 43 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AQUACULTURE MARKET, THROUGH 2020 (\$ MILLIONS/%)	128
TABLE 44 GROUNDWATER CONTAMINANTS SUSCEPTIBLE TO OZONE	133
TABLE 45 OZONE AND CONVENTIONAL LAUNDRY CYCLE COST COMPARISON	134
TABLE 46 GLOBAL OZONE GENERATION TECHNOLOGY IN THE REMAINING WATER APPLICATIONS MARKET, THROUGH 2020 (\$ MILLIONS/%)	138
TABLE 47 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS/%)	139
TABLE 48 GLOBAL OZONE TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET BY SEGMENT, THROUGH 2020 (\$ MILLIONS)	139
TABLE 49 GLOBAL MARKET SHARE FOR OZONE TECHNOLOGY IN AIR AND GAS TREATMENT BY SEGMENT, 2015 (%)	141
TABLE 50 GLOBAL OZONE GENERATION TECHNOLOGY IN THE SEMICONDUCTOR APPLICATIONS MARKET, THROUGH 2020 (\$ MILLIONS/%)	143
TABLE 51 TYPICAL INDUSTRIAL ODOR CONTROL DOSAGES (PPM)	145
TABLE 52 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER AIR AND GAS TREATMENTS MARKET, THROUGH 2020 (\$ MILLIONS/%)	149
TABLE 53 THERAPEUTIC OZONE USES	151
TABLE 54 VETERINARY OZONE THERAPY APPLICATIONS	153
TABLE 55 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MEDICINE MARKET, THROUGH 2020 (\$ MILLIONS/%)	155
TABLE 56 GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY REGION, 2020 (\$ MILLIONS)	158
TABLE 57 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY BY REGION, 2015 (%)	159
TABLE 58 ASIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	160
TABLE 59 NORTH AMERICAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	161



<b>TABLE HEADING</b>	<b>PAGE NO.</b>
TABLE 60 EUROPEAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	162
TABLE 61 MIDDLE EASTERN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	163
TABLE 62 LATIN AMERICAN AND CARIBBEAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	164
TABLE 63 AFRICAN OZONE GENERATION TECHNOLOGY MARKET, 2020 (\$ MILLIONS/%)	165
TABLE 64 AUSTRALIAN AND OCEANIA OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	166
TABLE 65 U.S. MARKET FOR OZONE GENERATION TECHNOLOGY, THROUGH 2020 (\$ MILLIONS/%)	167
TABLE 66 U.S. OZONE GENERATION TECHNOLOGY MARKET BY REGION, 2015 (\$ MILLIONS)	167
TABLE 67 CHINESE OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	169
TABLE 68 JAPANESE OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	170
TABLE 69 INDIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	171
TABLE 70 GERMAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	172
TABLE 71 CANADIAN OZONE GENERATION TECHNOLOGY, THROUGH 2020 (\$ MILLIONS/%)	172
TABLE 72 CANADIAN OZONE GENERATION TECHNOLOGY MARKET, BY REGION, 2015 (%)	173
TABLE 73 U.K. OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS)	175
TABLE 74 FRENCH OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	176
TABLE 75 RUSSIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	177
TABLE 76 BRAZILIAN OZONE GENERATION TECHNOLOGY MARKET, THROUGH 2020 (\$ MILLIONS/%)	178
TABLE 77 GRANTED PATENTS BY REGION, 2004-2014 (NUMBER OF PATENTS)	180
TABLE 78 U.S. PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014	181
TABLE 79 U.S. PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013	184
TABLE 80 U.S. PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2012	188
TABLE 81 EUROPEAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014	192
TABLE 82 EUROPEAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013	194
TABLE 83 EUROPEAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2012	197
TABLE 84 CANADIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014	199
TABLE 85 CANADIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013	200
TABLE 86 CANADIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2012	201
TABLE 87 AUSTRALIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2014	202
TABLE 88 AUSTRALIAN PATENTS CONTAINING THE WORD OZONE IN THE TITLE, 2013	202

**LIST OF FIGURES**

<b>FIGURE TITLE</b>	<b>PAGE NO.</b>
SUMMARY FIGURE GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY APPLICATION, 2014-2020 (\$ MILLIONS)	6
FIGURE 1 FRESHWATER STRESS, 1995-2025	41
FIGURE 2 GLOBAL OZONE GENERATION TECHNOLOGY MARKET BY MAJOR APPLICATION CATEGORIES, 2014-2020 (\$ MILLIONS)	82
FIGURE 3 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WATER APPLICATIONS MARKET, 2014-2020 (\$ MILLIONS)	84
FIGURE 4 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	84
FIGURE 5 GLOBAL OZONE TECHNOLOGY IN THE POTABLE WATER TREATMENT MARKET BY TYPE, 2014-2020 (\$ MILLIONS)	86
FIGURE 6 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN POTABLE WATER TREATMENT BY TYPE, 2015 (\$ MILLIONS)	87
FIGURE 7 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL POTABLE WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	90
FIGURE 8 GLOBAL OZONE GENERATION TECHNOLOGY IN THE BOTTLED POTABLE WATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS)	92
FIGURE 9 GLOBAL OZONE GENERATION TECHNOLOGY IN THE RESIDENTIAL POTABLE WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	93
FIGURE 10 GLOBAL OZONE GENERATION TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET, THROUGH 2020 (\$ MILLIONS)	96
FIGURE 11 GLOBAL OZONE TECHNOLOGY IN THE WASTEWATER TREATMENT MARKET BY SEGMENT, 2014-2020 (\$ MILLIONS)	97
FIGURE 12 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY, IN WASTEWATER TREATMENT BY SEGMENT, 2015 (%)	98
FIGURE 13 GLOBAL OZONE GENERATION TECHNOLOGY IN THE INDUSTRIALWASTEWATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	102
FIGURE 14 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MUNICIPAL WASTEWATER MARKET, 2014-2020 (\$ MILLIONS)	104
FIGURE 15 GLOBAL OZONE GENERATION TECHNOLOGY IN THE PROCESS WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	120
FIGURE 16 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	122
FIGURE 17 GLOBAL OZONE TECHNOLOGY IN THE OTHER WATER TREATMENT MARKET BY SEGMENT, 2014-2020 (\$ MILLIONS)	123
FIGURE 18 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY IN OTHER WATER TREATMENT BY SEGMENT, 2015 (%)	124
FIGURE 19 GLOBAL OZONE GENERATION TECHNOLOGY IN THE POOL AND SPA WATER TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	126
FIGURE 20 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AQUACULTURE MARKET, 2014-2020 (\$ MILLIONS)	128
FIGURE 21 GLOBAL OZONE GENERATION TECHNOLOGY IN THE REMAINING WATER APPLICATIONS MARKET, 2014-2020 (\$ MILLIONS)	138
FIGURE 22 GLOBAL OZONE GENERATION TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET, 2014-2020 (\$ MILLIONS)	139
FIGURE 23 GLOBAL OZONE TECHNOLOGY IN THE AIR AND GAS TREATMENT MARKET BY SEGMENT, 2014-2020 (\$ MILLIONS)	140
FIGURE 24 GLOBAL MARKET SHARE FOR OZONE TECHNOLOGY IN AIR AND GAS TREATMENT BY SEGMENT, 2015 (%)	141
FIGURE 25 GLOBAL OZONE GENERATION TECHNOLOGY IN THE SEMICONDUCTOR APPLICATIONS MARKET, 2014-2020 (\$ MILLIONS)	143

<b>FIGURE TITLE</b>	<b>PAGE NO.</b>
FIGURE 26 GLOBAL OZONE GENERATION TECHNOLOGY IN THE OTHER AIR AND GAS TREATMENTS MARKET, 2014-2020 (\$ MILLIONS)	149
FIGURE 27 GLOBAL OZONE GENERATION TECHNOLOGY IN THE MEDICINE MARKET, 2014-2020 (\$ MILLIONS)	155
FIGURE 28 GLOBAL MARKET SHARE FOR OZONE GENERATION TECHNOLOGY BY REGION, 2015 (%)	159
FIGURE 29 ASIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	160
FIGURE 30 NORTH AMERICA OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	161
FIGURE 31 EUROPEAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	162
FIGURE 32 MIDDLE EASTERN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	163
FIGURE 33 LATIN AMERICAN AND CARIBBEAN MARKET FOR OZONE GENERATION TECHNOLOGY, 2014-2020 (\$ MILLIONS)	164
FIGURE 34 AFRICAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	165
FIGURE 35 AUSTRALIAN AND OCEANIA OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	166
FIGURE 36 U.S. OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	167
FIGURE 37 U.S. MARKET SHARE FOR OZONE GENERATION TECHNOLOGY BY REGION, 2015 (%)	168
FIGURE 38 CHINESE OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	169
FIGURE 39 JAPANESE OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	170
FIGURE 40 INDIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	171
FIGURE 41 GERMAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	172
FIGURE 42 CANADIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	173
FIGURE 43 CANADIAN OZONE GENERATION TECHNOLOGY MARKET BY REGION, 2015 (%)	174
FIGURE 44 U.K. OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	175
FIGURE 45 FRENCH OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	176
FIGURE 46 RUSSIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	177
FIGURE 47 BRAZILIAN OZONE GENERATION TECHNOLOGY MARKET, 2014-2020 (\$ MILLIONS)	178
FIGURE 48 PATENTS GRANTED BY REGION, 2004-2014 (NUMBER OF PATENTS)	180