

INTRODUCTION	XVIII
REASONS FOR DOING STUDY	XVIII
CONTRIBUTIONS OF THE STUDY AND FOR WHOM.....	XVIII
SCOPE AND FORMAT	XVIII
METHODOLOGY	XIX
INFORMATION SOURCES.....	XIX
RELATED BCC WORK CREDENTIALS	XX
BCC ON-LINE SERVICES.....	XX
DISCLAIMER	XXI
 SUMMARY.....	XXII
<i>SUMMARY TABLE SUMMARY GLOBAL VALUE OF PREMIUM PORTABLE POWER SOURCES, BY TYPE, THROUGH 2009 (\$ MILLIONS).....</i>	XXIII
<i>SUMMARY FIGURE SUMMARY GLOBAL VALUE OF PREMIUM PORTABLE POWER SOURCES, BY TYPE, 2000-2009 (\$ MILLIONS)</i>	XXIV
 OVERVIEW	1
LEGACY	1
LEGACY (CONTINUED).....	2
DEMOGRAPHICS	3
BATTERY IMPROVEMENTS.....	3
VALUE OF TOTAL BATTERY MARKET	4
FUNDAMENTALS	5
TYPES OF FUEL CELLS FOR PREMIUM PORTABLE POWER	6
BASIC CONCEPTS.....	6
Performance.....	7
Construction.....	8
COST ISSUES	8
FUEL SUPPLIES AND SOURCES.....	9
PROTON-EXCHANGE MEMBRANE FUEL CELLS	9
TECHNOLOGY STATUS	10
DIRECT METHANOL FUEL CELLS.....	10
CROSSOVER REDUCTION.....	11
REGENERATIVE FUEL CELLS.....	12
ALKALINE FUEL CELLS	13
MOLTEN-CARBONATE FUEL CELLS.....	13
SOLID OXIDE FUEL CELLS	13
METAL-AIR FUEL CELLS.....	14
ZINC-AIR.....	14
SHAPE OF THE GLOBAL FUEL CELL MARKET.....	15
FUEL CELL PORTABLE POWER DEVICES AND MARKET	16
LAPTOP COMPUTERS	16
<i>TABLE 1 GLOBAL LAPTOP COMPUTER UNITS, THROUGH 2009 (MILLION UNITS).....</i>	17

<i>TABLE 2 GLOBAL MARKET FOR FUEL CELL UNITS FOR LAPTOP COMPUTERS, THROUGH 2009 (MILLION UNITS).....</i>	18
<i>TABLE 3 GLOBAL VALUE OF FUEL CELLS FOR LAPTOP COMPUTERS, THROUGH 2009 (\$ MILLIONS)</i>	18
<i>CELLULAR TELEPHONES</i>	19
<i>TABLE 4 GLOBAL CELL PHONE AND RELATED UNITS, THROUGH 2009 (MILLION UNITS)</i>	20
<i>TABLE 5 GLOBAL MARKET FOR FUEL CELL UNITS FOR CELLULAR TELEPHONES AND ENHANCED UNITS, THROUGH 2009 (MILLION UNITS)</i>	21
<i>TABLE 6 GLOBAL VALUE FOR FUEL CELLS IN CELLULAR TELEPHONES AND ENHANCED UNITS, THROUGH 2009 (\$ MILLIONS).....</i>	21
<i>MILITARY</i>	22
<i>Military (Continued).....</i>	23
<i>Systems Devices Market</i>	24
<i>TABLE 7 GLOBAL VALUE ZINC-AIR BATTERIES IN MILITARY SYSTEMS/DEVICES, THROUGH 2009 (\$ MILLIONS).....</i>	24
<i>Portable Applications Market</i>	25
<i>TABLE 8 GLOBAL VALUE HYDROGEN FUEL CELLS MILITARY PORTABLE APPLICATIONS, THROUGH 2009 (\$ MILLIONS).....</i>	25
<i>TABLE 9 SUMMARY OF GLOBAL VALUE OF FUEL CELLS FOR MILITARY PORTABLE APPLICATIONS, THROUGH 2009 (\$ MILLIONS)</i>	25
<i>TABLE 10 GLOBAL VALUE PORTABLE COMFORT AND LEISURE POWER DEVICES, THROUGH 2009 (\$ MILLIONS)</i>	26
<i>Portable Applications Market (Continued).....</i>	27
<i>TABLE 11 GLOBAL VALUE FUEL CELLS IN COMFORT/LEISURE PORTABLE POWER, THROUGH 2009 (\$ MILLIONS)</i>	28
<i>OTHER AND EMERGING MARKET SECTORS</i>	28
<i>Entertainment</i>	28
<i>Entertainment (Continued)</i>	29
<i>Personal Digital Assistants.....</i>	30
<i>Tools</i>	30
<i>Surveillance and Sensors</i>	31
<i>Medical</i>	31
<i>TABLE 12 GLOBAL VALUE OF PORTABLE FUEL CELLS IN OTHER AND EMERGING APPLICATIONS, THROUGH 2009 (\$ MILLIONS)</i>	32
FUEL CELLS FOR PREMIUM PORTABLE POWER	33
ISSUES FOR SMALL AND PORTABLE FUEL CELL APPLICATIONS	34
<i>METHANOL AND COMMERCIAL TRANSPORT REGULATIONS.....</i>	34
<i>Methanol and Commercial Transport...(Continued)</i>	35
COMPONENT LIFE CYCLE ASSESSMENT	36
<i>MICRO-STEAM METHANOL REFORMING</i>	37
<i>TABLE 13 LIQUID FUEL CELL ENERGY COMPARISON</i>	38
INDUSTRY STRUCTURE FOR PORTABLE FUEL CELLS	38
<i>MARKET SHARES</i>	38
<i>INDUSTRY LEADERS</i>	39

TECHNOLOGY LEADERS	39
CONCENTRATION FACTORS.....	39
DISTRIBUTION FACTORS	39
INDEX AND PROFILES OF PLAYERS IN THE PORTABLE FUEL CELL INDUSTRY	40
3M	40
3P-ENERGY GMBH	40
AALBORG UNIVERSITY	41
ADAPTIVE MATERIALS, INC.	42
ADVANCED COUNTERMEASURE (ACM) SYSTEMS	42
ADELAN, LTD	43
THE ALBERTA RESEARCH COUNCIL (ARC).....	43
ANGSTROM POWER, INC.	44
#106 - 980 West 1st Street	44
ARCOTRONICS FUEL CELLS.....	44
AUTOMATISATION VINCENT POIRIER.....	45
AXANE FUEL CELL SYSTEMS.....	45
BALL AEROSPACE	45
BALLARD POWER SYSTEMS	46
BATTERY AND FUEL CELL RESEARCH CENTER	47
BECKMANN ENGINEERING.....	47
BEE POWER SYSTEMS.....	48
BEIJING FUYUAN FUEL CELL GROUP	48
BICWORLD	49
BOLTON INSTITUTE	49
BROWN UNIVERSITY.....	50
BWT AKTIENGESELLSCHAFT	50
FUMA-TECH GMBH	51
CABOT SUPERIOR MICROPOWDERS.....	52
CALIFORNIA INSTITUTE OF TECHNOLOGY	53
CASE WESTERN RESERVE UNIVERSITY.....	54
Case Western Reserve University (Continued).....	55
CASIO	56
CHALMERS UNIVERSITY OF TECHNOLOGY.....	57
CREARE ENGINEERING AND DEVELOPMENT	57
DAIDO METAL, LTD/ NEWAVE POWER.....	58
DAIS-ANALYTIC CORP.....	58
DALIAN SUNRISE POWER CO. LTD	59
DELTA ELECTRONICS	60
CEA - NOUVELLES TECHNOLOGIES DE L'ENERGIE	60
DARPA/DSO	61
DCH TECHNOLOGY.....	61
DIRECT METHANOL FUEL CELL CORP.....	62
DTI ENERGY, INC.	62

EASTMAN KODAK	63
DUPONT FUEL CELL ENTERPRISE	63
EC POWER, INC.....	64
EC Power, Inc. (Continued).....	65
ELECTROCHEM, INC.	66
ERNST MORITZ ARNDT UNIVERSITY	66
ENER1, INC.	67
ENERGY AND RESOURCES LABORATORIES	67
ENERGY RELATED DEVICES	68
ENERGY RESEARCH CENTER OF THE NETHERLANDS	68
ENERGY VISIONS INC	69
ENGELHARD CORP.	70
E-TEK DIVISION OF DE NORA NORTH AMERICA, INC.....	71
FIRM GREEN ENERGY, INC.....	71
FOAMEX	72
FRAUNHOFER INSTITUTE FOR SOLAR ENERGY SYSTEMS	72
FUJIAN NANPING NANFU BATTERY CO.....	72
FUJITSU LABORATORIES LTD.	73
THE GAS TECHNOLOGY INSTITUTE.....	74
GILLETTE CO.	75
GINER, INC.	76
H ₂ ECONOMY	77
HARRIS CORP.	77
HEADWATERS, INC.....	78
HELIOCENTRIS ENERGY SYSTEMS, INC.	78
HEWLETT PACKARD CO.	78
Hewlett Packard Co. (Continued)	79
HITACHI LTD.....	80
HITACHI CABLE, LTD.	81
HUANYU POWER SOURCE CO., LTD.....	82
HYDROGEN INSTITUTE OF APPLIED TECHNOLOGIES	
GMBH.....	83
HOKKAIDO UNIVERSITY	83
HONG KONG UNIVERSITY OF SCIENCE AND	
TECHNOLOGY.....	84
H-TEC WASSERSTOFF-ENERGIE-SYSTEME GMBH.....	85
ILLINOIS INSTITUTE OF TECHNOLOGY (IIT)	85
INNOVATIVE CHEMICAL AND ENVIRONMENTAL	
TECHNOLOGIES	86
INTEGRATED FUEL CELL TECHNOLOGIES, INC. (IFCT)	86
INTERNATIONAL METHANOL PRODUCERS AND	
CONSUMERS ASSOCIATION (IMPCA)	87
INDIAN INSTITUTE OF SCIENCE.....	87
INFINEON TECHNOLOGIES AG.....	88

INSTITUTE OF CATALYSIS, CSIC	88
INSTITUTO MEXICANO DEL PETRÓLEO	89
INTEL CORP.....	89
INTIG.....	89
ITM POWER LTD.	90
JADOO POWER SYSTEMS	91
JET PROPULSION INSTITUTE	92
KAKEN, INC.	92
KANSAI COLLABORATION	92
KOREA ELECTRIC POWER RESEARCH INSTITUTE	93
KWANGJU INSTITUTE OF SCIENCE AND TECHNOLOGY.....	93
LAWRENCE LIVERMORE NATIONAL LABORATORY	94
LILLIPUTIAN SYSTEMS, INC.	95
LYNNTECH, INC.....	96
MANHATTAN SCIENTIFICS.....	97
MASTERFLEX AG.....	98
MATERIAL & ENERGY RESEARCH INSTITUTE OF TOKYO, LTD.....	99
MUSASHI INSTITUTE OF TECHNOLOGY/MEMBRANE.....	99
MUSASHI INSTITUTE OF TECHNOLOGY/CATALYST.....	100
MECHANICAL TECHNOLOGY	100
MEDIS TECHNOLOGIES.....	101
Medis Technologies (Continued)	102
MESOFUEL	103
MITSUBISHI CORP.	104
MITSUBISHI GAS CHEMICAL CO., INC.	104
MODUCELL, INC.	105
MEDIS TECHNOLOGIES.....	105
Medis Technologies (Continued)	106
MURORAN INSTITUTE OF TECHNOLOGY	107
NANODYNAMICS ENERGY	108
NANOMATERIALS DISCOVERY CORP.....	108
NEAH POWER SYSTEMS	109
NEC CORP.	110
NEDSTACK.....	111
NISHI NIHON RADIO CO., LTD.....	112
NORTHEASTERN UNIVERSITY.....	113
NTT DOCOMO, INC.	113
NUVANT SYSTEMS.....	114
OXFORD PERFORMANCE MATERIALS, INC.	114
PACIFIC FUEL CELL CORP.....	115
PALCAN FUEL CELL CO.....	115
PAXITECH	116
PEMEA'S FUEL CELL TECHNOLOGIES	116

PENNSYLVANIA STATE UNIVERSITY	117
POLYFUEL	117
Polyfuel (Continued)	118
POWERTEK INTERNATIONAL	119
PROTONEX TECHNOLOGY CORP.	119
POWERZYME, INC.	120
POWER & ENERGY	121
Power & Energy (Continued)	122
QINETIQ	123
RAMOT LTD.	124
RELI-ON/AVISTA LABS	124
RENEW POWER/TEKION	125
Renew Power/Tekion (Continued).....	126
RESEARCH INSTITUTE FOR GREEN TECHNOLOGY OF AIST.....	127
RITE, KANSAI ELECTRIC POWER, TORAY INDUSTRIES, SHARP & HORIBA.....	128
RITE & SHARP	128
ROGERS CORP.....	129
RÜCKER IBÉRICA.....	129
SAMSUNG.....	130
SANDIA LABORATORY	131
SHINANO KENSHI.....	132
SIEMENS AG	132
SMART FUEL CELL GMBH.....	133
Smart Fuel Cell GmbH (Continued)	134
SMOTECH BRENNSTOFFZELLEN GMBH	135
SOHGO SECURITY SERVICES CO., LTD.	136
SONY CORP.....	136
SRE - SOLUÇÕES RACIONAIS DE ENERGIA, S.A.....	137
STANFORD UNIVERSITY	138
ST. LOUIS UNIVERSITY.....	138
STMICROELECTRONICS	139
TECHNOLOGY RESEARCH LABORATORIES, INC.....	140
TECHSYS, INC.	141
TECHNISCHE UNIVERSITÄT CLAUSTHAL	142
TEKION SOLUTIONS, INC.....	142
TEL-AVIV UNIVERSITY (TAU)	143
THINXXS GMBH	143
TOKYO METROPOLITAN UNIVERSITY	144
TOKAI CORP.	144
TOKAI CARBON.....	145
TONGJI UNIVERSITY.....	145
TOSHIBA CORP. FUEL CELL SYSTEMS DIVISION	146

Toshiba Corp. Fuel Cell...(Continued).....	147
TELEDYNE ENERGY SYSTEMS, INC.....	148
TOKYO INSTITUTE OF TECHNOLOGY.....	149
TORAY	149
TOYOB0 CO., LTD.	150
TULANE UNIVERSITY	150
UBE INDUSTRIES, LTD./TOAGOSEI CO., LTD.	151
UMICORE	152
UNITED DEFENSE.....	152
U.S. ARMY RESEARCH LABORATORY	153
UNITED TECHNOLOGIES FUEL CELLS.....	153
UNIVERSITY OF BIRMINGHAM.....	154
UNIVERSITY OF CALIFORNIA LOS ANGELES.....	154
UNIVERSITY OF ILLINOIS.....	155
UNIVERSITY OF ILLINOIS.....	156
UNIVERSITY OF MASSACHUSETTS.....	157
UNIVERSITAT STUTTGART LEHRSTUHL.....	158
UNIVERSITY OF PENNSYLVANIA.....	158
UNIVERSITY OF TEXAS.....	159
UNIVERSITY OF TOKYO.....	160
TOKYO METROPOLITAN UNIVERSITY	160
VENTURE SCIENTIFIC INTERNATIONAL	160
Venture Scientific International (Continued)	161
VIASPACE.....	162
VOLLER ENERGY	162
W. L. GORE FUEL CELL TECHNOLOGIES.....	163
YAMAHA MOTOR	163
YUASA CO., LTD.	164
ZENTRUM FÜR SONNENENERGIE UND WASSERSTOFF- FORSCHUNG	164
SUMMARY GLOBAL VALUE OF PORTABLE FUEL CELLS BY APPLICATION	165
<i>TABLE 14 SUMMARY GLOBAL VALUE OF PORTABLE FUEL CELLS, THROUGH 2009 (\$ MILLION).....</i>	165
<i>FIGURE 1 SUMMARY GLOBAL VALUE OF PORTABLE FUEL CELLS, 2000-2009 (\$ MILLION).....</i>	166
METAL-AIR FUEL CELLS FOR PORTABLE APPLICATIONS.....	167
USED LIKE PRIMARY BATTERIES.....	167
METAL-AIR FUEL CELLS VS BATTERIES.....	168
<i>TABLE 15 PARAMETERS COMPARED FOR SOME BATTERIES AND METAL-AIR FUEL CELLS</i>	168
ZINC-AIR FUEL CELLS	169
OPERATION	170
IMPROVED ANODE STRUCTURE	171
ELECTROCHEMICAL PACK	171

COSTS	172
TECHNOLOGY STATUS	173
PARAMETERS.....	173
<i>TABLE 16 ZINC-AIR FUEL CELL CHARACTERISTICS</i>	<i>174</i>
ALUMINUM-AIR.....	174
TECHNOLOGY STATUS	174
COSTS	175
MAGNESIUM-AIR	175
TECHNOLOGY STATUS	175
Improving Performance.....	176
COSTS	176
STRUCTURE OF THE METAL-AIR FUEL CELL INDUSTRY	176
<i>TABLE 17 SUMMARY STATUS AND APPLICATIONS FOR METAL-AIR FUEL CELL BY COMPANY.....</i>	<i>177</i>
COMPANY PROFILES	177
ALUMINUM POWER, INC.	178
AROTECH/ELECTRIC FUEL CORP.....	178
DAILY POWER, LTD.....	179
DOO WON INDUSTRIAL CO., LTD.....	179
EVIONYX	180
FUEL CELL TECHNOLOGIES CORP.....	180
DURACELL, INC.	181
INTERNATIONAL LTD.	182
GP BATTERIES USA	182
GREENVOLT	183
GUANGZHOU TIANQUIE ENTERPRISE CO., LTD.....	183
KUMBA BASE METALS	184
MATSUSHITA BATTERY INDUSTRIAL CO., LTD.	185
METALLIC POWER	186
PANASONIC OEM BATTERY SALES	186
SHENZHEN GAONENGDA BATTERY CO. LTD	187
PC & ASSOCIATES	187
PLESKAVA CO.	188
POWERZINC ELECTRIC, INC.....	188
RAYOVAC	189
RENATA BATTERIES.....	190
SCIENTIFIC APPLICATION & RESEARCH ASSOCIATES, INC.	190
ULTRAGUARD/ MAGPOWER.....	191
UNIPOWER.....	192
VOLTEK	193
ZINC MATRIX POWER, INC.....	193
ZOXY ENERGY SYSTEMS AG/CHEMTEK.....	194
Zoxy Energy Systems AG/Chemtek (Continued)	195
ZUHAI ZHI BATTERY CO., LTD.	196

OTHER COMPANIES	196
FUEL CELL TECHNOLOGIES/ALUPOWER	196
GLOBAL MARKET VALUE FOR METAL-AIR FUEL CELLS	197
<i>TABLE 18 WORLD ZINC-AIR FUEL CELL MARKET, THROUGH 2009 (MILLION \$).....</i>	<i>197</i>
PREMIUM SECONDARY BATTERIES FOR PORTABLE POWER.....	198
BACKGROUND	198
GLOBAL SECONDARY BATTERY PRODUCTION AND MARKET VALUE FOR PORTABLE PRODUCTS	199
GLOBAL SECONDARY BATTERY PRODUCTION.....	199
<i>TABLE 19 GLOBAL SMALL SECONDARY BATTERY PRODUCTION FOR PORTABLE DEVICES, BY TYPE, THROUGH 2009 (MILLIONS OF UNITS).....</i>	<i>200</i>
<i>FIGURE 2 GLOBAL SMALL SECONDARY BATTERY PRODUCTION FOR PORTABLE DEVICES, BY TYPE, 2001-2009 (MILLION UNITS).....</i>	<i>200</i>
Market Share for Small Secondary Lithium Batteries.....	201
Leading Regions	201
Leading Companies	201
<i>TABLE 20 COMPANY GLOBAL MARKET SHARES OF SMALL SECONDARY LITHIUM BATTERIES BY UNIT PRODUCTION, 2004.....</i>	<i>202</i>
<i>FIGURE 3 WORLD MARKET SHARES FOR SECONDARY LITHIUM BATTERY MAKERS FOR PORTABLE APPLICATIONS, 2004 (%).....</i>	<i>203</i>
VALUE GLOBAL SECONDARY BATTERY MARKET FOR PORTABLE APPLICATIONS	203
<i>TABLE 21 TYPICAL LITHIUM-ION BATTERY PRICES.....</i>	<i>204</i>
U.S. Market.....	204
<i>TABLE 22 COMPETITIVE U.S. MARKET FACTORS FOR LITHIUM-ION/POLYMER BATTERIES.....</i>	<i>204</i>
<i>TABLE 22 (CONTINUED).....</i>	<i>205</i>
SUMMARY GLOBAL VALUE LITHIUM-ION/POLYMER SECONDARY BATTERIES FOR PORTABLE DEVICES, THROUGH 2009	205
<i>TABLE 23 GLOBAL VALUE OF LITHIUM-ION/POLYMER SECONDARY BATTERIES FOR PORTABLE DEVICES, THROUGH 2009 (\$ MILLIONS).....</i>	<i>206</i>
<i>FIGURE 4 GLOBAL VALUE OF LITHIUM-ION/POLYMER SECONDARY BATTERIES FOR PORTABLE DEVICES, 2000-2009 (\$ MILLIONS)</i>	<i>206</i>
TECHNOLOGY OF LITHIUM BATTERIES	207
SECONDARY LITHIUM-ION BATTERY CHEMISTRY	207
LITHIUM-ION CHEMISTRY SECONDARY BATTERY TYPES.....	208
<i>TABLE 24 LITHIUM-ION VS. LITHIUM-POLYMER CHEMISTRY SECONDARY BATTERY</i>	<i>209</i>
LITHIUM-POLYMER IMPROVEMENTS	209
TECHNIQUE FOR MICROBATTERIES	210
INDEX OF LITHIUM BATTERY MANUFACTURERS FOR PORTABLE APPLICATIONS.....	210
3M BATTERY	211
AEA BATTERY SYSTEMS.....	211
ABLE NEW ENERGY CO., LTD.....	212
AGM BATTERIES LTD.....	212

ALEGNA INNOVATIONS, LLC.....	213
ALLYTEC BATTERY CO., LTD.....	214
ANASKA BATTERY TECHNOLOGY CO., LTD.....	214
ADVANCED BATTERY MANAGEMENT, LTD.....	214
ALLIANT POWER	215
AMPEREX TECHNOLOGY	216
APL TECH BATTERY INDUSTRY SDN BHD.....	217
AROTECH/EPSILOR.....	217
AVESTOR.....	218
BAR ILAN UNIVERSITY.....	218
BASF AG.....	219
BATECH KOREA, INC.....	220
BATTERY ENGINEERING, INC.....	220
BEYONICS TECHNOLOGY, LTD.....	221
BENDER GMBH	221
BETTING INDUSTRIAL DEVELOPMENT CO., LTD.....	222
BRIDGESTONE CORP.....	222
BYD CO., LTD.....	223
CALEB TECHNOLOGY CORP.....	223
CHINA HYPER BATTERY CO., LTD.....	224
C-TECH UNITED CORP.....	225
CLESCELL INTERNATIONAL BATTERY CO.....	226
CELLINX INDUSTRIES	227
CENTURION WIRELESS COMPONENTS SDN. BHD.....	227
CHINA HI-TECH COMMUNICATION ELECTRONIC CO., LTD.....	227
CYMBET CORP.....	228
DAILY POWER BATTERIES, LTD.....	228
DAKE BATTERY CO., LTD.....	229
DANIONICS A/S	229
DONG YANG R&D CO., LTD.....	230
DONGGUAN DAKE BATTERY CO., LTD.....	230
DOUGHTY HANSON	230
DOOYOUN CORP.....	231
DUAL VOLTAGE CO., LTD.....	231
DURACELL INTERNATIONAL.....	231
DYNA, INC	232
DYNAMIX COSMO PRIVATE LTD.....	232
E-ONE MOLI ENERGY (CANADA) LTD.....	233
EEMB BATTERY CO.....	233
EAGLE-PICHER TECHNOLOGIES, LLC	233
ENER1, INC.....	234
ELECTROVAYA, INC.....	235
ENERGIZER HOLDINGS, INC.....	236

EVERLASTING BATTERY LTD.	236
EXCELLATRON SOLID STATE LLC	237
FDK CORP.	237
FMA DIRECT	237
FMC LITHIUM	238
FRONT EDGE TECHNOLOGY	238
Front Edge Technology (Continued).....	239
GD TELECOM INDUSTRIAL CORP.	240
GBP BATTERY CO., LTD.	240
GRAND PROSPERITY CORP.....	241
GREAT POWER BATTERY CHINA, LTD.	241
GREEN POWER BATTERY CO., LTD.	242
GREPOW BATTERY CO., LTD.....	242
GS-MELCOTEC USA, INC.....	242
GLOBTEK, INC.	243
GOLD PEAK INDUSTRIES NORTH AMERICA.....	243
GP Batteries International Limited	243
GUANGZHOU MARKYN BATTERY CO. LTD.....	243
JAPAN STORAGE BATTERY.....	244
GS-MELCOTEC CO., LTD.	244
HAWKER ETERNACELL/SAFT LTD.	244
HITACHI MAXELL, LTD.	245
HYNERGY POWER CO.....	245
HUANYU POWER SOURCE CO., LTD.....	246
HYB BATTERY CO., LTD.	247
IBT POWER LTD.	247
IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY.....	247
Idaho National Engineering and...(Continued)	248
INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE	249
INDUSTRIES INTERNATIONAL, INC.	249
INTELLECT BROTHERS, LTD.	250
ION ENERGY.....	251
IONITY AG.....	251
ITN ENERGY SYSTEMS, INC.	251
ITN Energy Systems, Inc. (Continued).....	252
INFINITE POWER SOLUTIONS	253
JAPAN STORAGE BATTERY CO., LTD.....	254
KODAK.....	254
KYM ELECTRONICS SDN, BHD.....	255
LESEN POWER TECHNOLOGY CO. LTD.....	255
LITHION, INC.	256
LITHIUM TECHNOLOGY CORP.....	256
LG CHEM	257

MACRO ENERGY-TECH., INC.	257
MAHA ENERGY CORP.	257
MATSUSHITA BATTERY/PANASONIC	257
MAXELL	258
MICRO POWER ELECTRONICS	259
MOTOROLA	259
NARADA LICOM POWER TECH. CO., LTD.	260
NASA GLENN RESEARCH CENTER	261
NEC CORP.	261
NEXCON TECHNOLOGY, INC.	262
NGK SPARK PLUG (USA), INC./NTK POWERDEX	262
NRGCELLS	263
OPTODOT CORP.	263
OZARK FLUORINE SPECIALTIES	264
PAG ADVANCED BATTERY MANAGEMENT LTD.	264
PANASONIC/MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.	265
PEACEBAY POWER CO.	265
PHILIPS (ROYAL PHILIPS ELECTRONICS)	266
PHOSTECH LITHIUM	266
POLYPLUS BATTERY CO.	267
POLYSTOR CORP.	268
POWER TECHNOLOGIES, INC.	268
PREFERRED POWER TECHNOLOGIES	269
PROGRESSIVE TECHNOLOGIES, INC.	269
PROPINE BATTERY CO., LTD.	269
OAK RIDGE MICRO-ENERGY, INC.	269
QUALLION, LLC	270
Quallion, LLC (Continued)	271
RENATA	272
RICKBERY INDUSTRIAL, LTD.	273
ROOFER COMMERCE CO., LTD.	273
SAFT	273
SAMSUNG SDI CO., LTD.	274
SANYO ELECTRIC	274
SKC CO., LTD.	275
SONY CORP.	276
SANSA POWER SOURCE CO. LTD.	276
SHENZHEN B&K TECHNOLOGY CO. LTD.	277
SHENZHEN XIN HAOTHEYI INDUSTRIAL CO., LTD.	277
SHENZHEN SANSAN INDUSTRIAL CORP.	278
SHENZHEN KETELI TELECOMMUNICATION CO., LTD	278
SHANGHAI SUPERPOWER ELECTRONIC CO., LTD.	278
SHENZHEN GAONENGDA BATTERY CO., LTD	279

SHENZHEN OCEANWIDE BATTERY CO., LTD,	279
SMART BATTERY ENGINEERING SDN. BHD.	279
SOLICORE, INC.	280
SOLID ENERGY GMBH	280
SOUTHWEST ELECTRONICS ENERGY CORP.	281
STONE BATTERY INDUSTRIES.....	281
TADIRAN, INC. BATTERY DIVISION	282
TIANJIN LISHEN BATTERY JOINT-STOCK CO. LTD.....	283
TCL HYPERPOWER	284
TELECORDIA TECHNOLOGIES.....	284
TIANJIN LISHEN BATTERY JOINT-STOCK CO., LTD.....	285
TOSHIBA.....	285
ULTRALIFE BATTERIES, INC.....	286
UNIROSS BATTERIES,	287
U.S. LITHIUM ENERGETICS, LLC.....	287
VARTA GERÄTEBATTERIE GMBH.....	288
VALENCE TECHNOLOGY, INC.....	288
VITZROCELL CO., LTD.....	289
WUHAN LIXING POWER SOURCES CO., LTD.....	289
WILSON GREATBATCH LTD.....	290
WORLEY AUSTRALIA ENERGY.....	290
XENO ENERGY	291
XIANYANG PIANZHUAN GROUP CORP.....	291
YARDNEY TECHNICAL PRODUCTS, INC.	292
YUNTONG POWER CO., LTD.....	293
YEREVAN RESEARCH INSTITUTE OF OPTICAL AND PHYSICAL MEASUREMENTS	293
ZHEJIANG WANMA GROUP ELECTRON CO., LTD.	294
ZHONGQIANG POWER-TECH GROUP.....	294
ZHAOQING FENGHUA LITHIUM BATTERY CO., LTD.....	295
ZHONGYIN (NINGBO) BATTERY CO., LTD.	295
OTHER DEVELOPMENTS.....	296
OTHER DEVELOPMENTS (CONTINUED)	297
APPENDIX	298
TECHNOLOGY STATUS SUMMARY OF GLOBAL PORTABLE FUEL CELL COMPANIES	298
TECHNOLOGY STATUS SUMMARY OF ... (CONTINUED)	299