

## 2009-2013 Deep Research Report on China Solar Grade Polysilicon Industry

Hard copy :2500 USD

Electronic copy(PDF) :2500USD

Hard and Electronic copy :3000USD

Pages:394

Tables and figures : 339

Published date : Mar 31, 2009

Publisher: QY Research Group

Contact: Mr Zhang Dong 86-10-82945717 86-13811796901 sales@qyresearch.com

### Summary:

《2009-2013 Deep Research Report on China Solar Grade Polysilicon Industry》 was published by QYResearch Solar Energy Research Center in Mar 2009. It was a deep research report on China and Global SG polysilicon industry. In this report, the following information was included:

Global and China Polysilicon Supply Demand 2006-2008 data and 2009-2013 forecast

Detail information of Global 70+ polysilicon projects

Project capacity production cost price profit profit margin technology source and equipments source expansion plan and investment return rate etc information were introduced in the commercial production projects

Project background technology feasibility expansion capacity production cost price etc information were introduced in the building projects

Market Share and comparison analysis by different technologies (Siemens FBR Physical Other Method) different manufacturers (Global 30+ companies) different regions (China US EU Japan etc regions)

Project development strategy was also introduced according supply and demand relationship

Also analyse global and China polysilicon development trend according Global PV industry development trend and related countries policies

At last, QYResearch listed deep research conclusions according polysilicon yesterday today and tomorrow and also analyse new polysilicon project feasibility via a special case.

.....

In a word, it was a deep research report on global and china polysilicon industry chain. And thanks to the global and China polysilicon marketing or technology experts support during QYResearch polysilicon research team survey and interviews.

**Table of Contents:****Chapter One Polysilicon Industry Overview 1**

- 1.1 Definition of Polysilicon 1
- 1.2 Classification and Application 4
- 1.3 Industry Chain Structure 6

**Chapter Two Manufacture Technology and Processes of Polysilicon 8**

- 2.1 Polysilicon Manufacturing Technology Overview 8
- 2.2 Seimens Method 10
- 2.3 Fluidized-bed Reactor(FBR) Method 17
- 2.4 Physical Method (UMG) 20
- 2.5 Other Method 25

**Chapter Three Polysilicon Productions Supply Sales Demand Market Status and Forecast 39**

- 3.1 Polysilicon Productions Overview 40
  - 3.1.1 Siemens Polysilicon Productions Overview 40
  - 3.1.2 FBR Polysilicon Productions Overview 45
  - 3.1.3 UMG Polysilicon Productions Overview 48
  - 3.1.4 Other Method Polysilicon Productions Overview 51
  - 3.1.5 Global Total Polysilicon Productions Overview 53
  - 3.1.6 Global EG Polysilicon Productions Overview 58
  - 3.1.7 Global SG Polysilicon Productions Overview 59
- 3.2 Polysilicon Demand 61
  - 3.2.1 Solar Cell Production Overview 61
  - 3.2.2 SG Polysilicon Demand 63
  - 3.2.3 EG Polysilicon Demand 64
- 3.3 Polysilicon Demand 64
  - 3.3.1 Supply and Demand of Global Polysilicon 64
  - 3.3.2 Supply and Demand of China Polysilicon 66
- 3.4 Polysilicon Cost Price Production Value Profit Purity 71

**Chapter Four Global Key Polysilicon Manufactuers 75**

- 4.1 Hemlock(US Michigan Siemens) 75
- 4.2 Wacker Chemie(Germany Burghausen Siemens FBR) 85
- 4.3 MEMC Electronic Materials(US Missouri FBR Siemens) 99

4.3.1 MEMC(US Texas FBR)	105
4.3.2 MEMC(Italy Merano Siemens)	107
4.4 REC(AsiMI+SGS)(Norway Oslo Siemens FBR)	108
4.4.1 REC(AsiMI)(US Montana Siemens)	121
4.4.2 REC(SGS)(US Washington FBR Siemens)	122
4.5 Tokuyama(Japan Shunan Siemens VLD)	123
4.6 Mitsubishi Materials(Japan Tokyo Siemens)	132
4.6.1 Mitsubishi Materials(Japan Yokkaichi Siemens)	135
4.6.2 Mitsubishi Polycrystalline Materials(US Alabama Siemens)	136
4.7 DC Chemical(Korea Kunsan Siemens)	138
4.8 M.SETEK(Japan Soma Siemens)	145
4.9 Osaka Titanium(Japan Hyogo Siemens)[Sumitomo Titanium]	155
4.10 Nitol Solar(Russia Usolie-Siberian Siemens)	161

### **Chapter Five China Key Polysilicon Manufacturers167**

5.1 GCL Silicon(Jiangsu Xuzhou Siemens)	168
5.2 SINO-SI(Henan Luoyang Siemens)	173
5.3 XINGUANG SILICON(Sichuan Leshan Siemens)	183
5.4 Emei Semiconductor(Sichuan Emeishan Siemens)	194
5.5 DAQO Group (Chongqing Wanzhou Siemens)	200
5.6 Tongwei and Juxing [Yongxiang Polysilicon] (Sichuan Leshan Siemens)	205
5.7 Shunda Polysilicon(Jiangsu Yangzhou Siemens)	208
5.8 Tehua New Material (Jiangsu Yancheng Siemens)	212
5.9 Sunshine Polysilicon (Ningxia Shizuishan Siemens)	215
5.10 JiangxiTn Silicon Material (Jiangxi Zhangshu Siemens)	220
5.11 CSG Polysilicon(Hubei Yichang Siemens)	226
5.12 Asia Silicon (Qinghai Xining Siemens)	232
5.13 LDK (Jiangxi Xinyu Siemens)	236

### **Chapter Six International Building or Planning Polysilicon Projects 241**

6.1 Hoku Materials (US Idaho Siemens)	241
6.2 MutoSilicon(Taiwan Pingdong SRI)	245
6.3 Top Green Energy Technologies (Taiwan Chung Ho Siemens)	247
6.4 Fuju Solar(Southern Taiwan Siemens)	249
6.5 Asahi Energy (CTSP SRI)	252
6.6 Silfab(Italy Padova Siemens)	252
6.7 TIMMINCO(Canada Quebec Physical)	256
6.8 WOONGJIN POLYSILICON(Korea Sangju Siemens)	267
6.9 Korea Advanced Materials (KMA)(Korea Chungcheong Siemens)	269
6.10 AE Polysilicon(US Pennsylvania FBR)	270
6.11 ESTELUX(Italy Ferrara Siemens)	272
6.12 Italsilicon(Italy Brugherio Siemens)	274
6.13 JAPAN SOLAR SILICON(Japan Kamisu New Technology)	276
6.14 "Semiconductor Plant" JSC (Ukraine Zaporozhye Siemens)	278

6.15 NorSun(Saudi Arabia Jubail Siemens)	281
6.16 Prime Solar(Germany Saxony-Anhalt Siemens)	282
6.17 Silpro(France Saint Auban Siemens)	283
6.18 Silicio Energia(Spain Málaga Siemens)	284
6.19 Elkem Solar(Norway Kristiansand Physical)	287
6.20 Dow Corning(Brazil PV 1101 Physical)	290
6.21 Globe Specialty Metals(US Ohio Physical)	292
6.22 ARISE Technologies(Canada Ontario Physical)	294
6.23 6N Silicon(Canada Ontario Physical)	297
6.24 JFE Steel(Japan Kurashiki Physical)	300
6.25 NS Solar Material (Japan Fukuoka Physical)	301
6.26 TSM(Holand Limburg Siemens)	302
6.27 PV Crystalox(Germany Bitterfeld Siemens)	305
6.28 Bhaskar Silicon(India Haldia Siemens)	308
6.28 RSI Silicon(US PA RSI)	309

## **Chapter Seven China Building or Planning Polysilicon Projects 316**

7.1 Shenzhou Silicon (Inner Mongolia Huhhot Siemens)	316
7.2 Zhongcai Group (Jiangsu Wuxi Siemens)	319
7.3 Sichuan Renen Silicon Material (Sichuan Meishan Siemens)	320
7.4 Yongwang Silicon (Sichuan Yaan Siemens)	322
7.5 CICO (Sichuan Chengdu Xinjin Siemens)	323
7.6 Jiangxi Jingda (Jiangxi Nanchang Siemens)	325
7.7 Lu'an Group (Shanxi Changzhi Siemens)	325
7.8 Yunnan Metallurgical Group (Yunnan Qujing Siemens)	333
7.9 TBEA (Xinjiang Urumqi Siemens)	334
7.10 Other Polysilicon Projects	336
7.10.1 Hubei QixingJingxing (Hubei Suizhou Siemens)	336
7.10.2 Yiyang Jingxin (Hunan Yiyang Physical)	336
7.10.3 Shanxi Tianhong Silicon Material (Shanxi Xianyang Siemens)	338
7.10.3 Nanjing Dalu Group (Inner Mongolia Huhhot Siemens)	340
7.10.4 HongKong Hongqiao Group (Shandong Jining Physical)	348
7.10.5 Shanghai ProPower Renewable Energy (Shanghai Nanhui Physical)	356
7.10.6 Nanan Sanjing (Fujian Nanan Physical)	359
7.10.7 Yinxing Polysilicon (Ningxia Wuzhong Physical)	361
7.10.8 JACO SOLARSI (Fujian Xiamen Physical)	362
7.10.9 Nanyang Green Silicon (Henan Fangcheng Physical)	364
7.10.10 Zhongning Silicon (Zhejiang Quzhou Siemens)	366
7.10.11 Jinhua Smelting (Liaoning Jinzhou Linghai Siemens)	367
7.10.12 Erdos (ErdosQipanjiang Siemens)	368
7.10.13 DTK Silicon (Shandong Qingdao Siemens)	369

## **Chapter Eight Feasibility Analysis of China New Polysilicon Projects 370**

8.1 Polysilicon Project Opportunity and Risk	370
--	-----

8.2 Feasibility Analysis of New Polysilicon Project 372

**Chapter Nine Polysilicon Research Summaries 374**

**Tables and Figures:**

Figure Rod and Nugget form Polysilicon Pictures 3

Table Difference of EG and SG poly silicon 4

Table MG/SG/EG silicon purity and 2007 average selling price(USD/Kg) 6

Figure Industry Chain Structure of Polysilicon 6

Figure Polysilicon Manufacturing Process Flow(Sand—Polysilicon) 7

Figure Polysilicon Industry Chain Structure(Upstream raw materials and downstream applications) 8

Table Chemical Equation of Siemens Method 10

Figure Manufacturing Process Flow of Siemens Method 11

Table Siemens Reaction Furnace Hydride Reactor System CDI end gas recycling system Polysilicon Manufacturing Technology Suppliers etc Equipment Suppliers List 11

Figure Siemens Method Polysilicon Manufacturing (Hemlock) Process Flow 13

Figure Improved Siemens Method Closed loop Polysilicon Production Process 14

Figure Illustration of Bell Bar 15

Table Siemens CVD Polysilicon Reactor Related Parameter Comparison of two different pressure 15

Figure Improved Siemens Method Finishing and Analysis Process 16

Table China 8 Polysilicon Projects Power Usage and Related Raw Materials Usage 16

Table Chemical Equation of MEMC FBR Method 18

Table FBR Method Advantage and Disadvantage List 18

Figure REC FBR Technology 19

Figure JFE Steel Physical Method (UMG) Silicon Manufacturing Process Flow 21

Figure JFE Metallurgical Method (Physical Purity Method) Process Flow 22

Figure Difference between JFE Metallurgical Method(Physical Purity Method) and Siemens Method 22

Table China Physical Method UMG Silicon Market Summary 23

Table US SRI Method Polysilicon Manufacturing Process 25

Figure US RSI Method Polysilicon Manufacturing Process Flow 25

Table Siemens FBR UMG etc Six Polysilicon Manufacturing Method Comparison 26

Table Difference between Improvement Siemens Method, Silane Decomposition Method, Fluidized-Bed Method Polysilicon Manufacturing Technology 27

Table, Comparative analysis of solar grade polysilicon manufacturing processes and principles of metallurgy process, gas-liquid deposition and purification for heavily-doped silicon waste 28

Table Some Polysilicon Manufacturers Manufacturing Processes and Their Intermediate Product 29

Table Process Flow of Siemens Method 30

Figure MG Silicon Manufacturing Process 35

Figure MG Silicon Manufacturing Process Structure	36
Figure Siemens Polysilicon Reactor(Wafer-cooled metal bell jar) Illustrative Diagram	37
Table List of New Technologies for Solar Grade Polysilicon	38
Table 2006-2013 Global Key Siemens Method Manufacturers Polysilicon Capacity (Ton) and Total Capacity List	40
Table 2006-2013 Global Key Siemens Method Manufacturers Polysilicon Capacity Market Share List	41
Table 2006-2013 Global Key Siemens Method Manufacturers Polysilicon Production (Ton) and Total Production List	41
Table 2006-2013 Global Key Siemens Method Manufacturers Polysilicon Production Market Share List	42
Figure 2006-2013 Global Siemens Method Polysilicon Capacity Production (Ton) and Grow Rate	44
Table 2006-2013 Global Siemens Method Polysilicon Total Capacity Utilization Rate List	44
Table 2006-2013 Global Siemens Method Polysilicon Production (Ton) Purity (xN) ASP.Cost.Profit (USD/Kg) Production Value (Million USD) Profit Margin etc List	45
Table 2006-2013 Global Key FBR Method Manufacturers Polysilicon Capacity (Ton) and Total Capacity List	45
Table 2006-2013 Global Key FBR Method Manufacturers Polysilicon Capacity Market Share List	45
Table 2006-2013 Global Key FBR Method Manufacturers Polysilicon Production (Ton) and Total Production List	46
Table 2006-2013 Global Key FBR Method Manufacturers Polysilicon Production Market Share List	46
Figure 2006-2013 Global FBR Method Polysilicon Capacity Production (Ton) and Grow Rate	46
Table 2006-2013 Global FBR Method Polysilicon Total Capacity Utilization Rate List	47
Table 2006-2013 Global FBR Method Polysilicon Production (Ton) Purity (xN) ASP.Cost.Profit (\$/Kg) Production Value (Million \$) Profit Margin etc List	47
Table 2006-2013 Global Key Physical Method Manufacturers Polysilicon Capacity (Ton) and Total Capacity List	48
Table 2006-2013 Global Key Physical Method Manufacturers Polysilicon Capacity Market Share List	48
Table 2006-2013 Global Key Physical Method Manufacturers Polysilicon Production (Ton) and Total Production List	48
Table 2006-2013 Global Key Physical Method Manufacturers Polysilicon Production Market Share List	49
Figure 2006-2013 Global Physical Method Polysilicon Capacity Production (Ton) and Grow Rate	49
Table 2006-2013 Global Physical Method Polysilicon Total Capacity Utilization Rate List	50
Table 2006-2013 Global Physical Method Polysilicon Production (Ton) Purity (xN) ASP.Cost.Profit (\$/Kg) Production Value (Million \$) Profit Margin etc List	50
Table 2006-2013 Global Other Method Manufacturers Polysilicon Capacity (Ton) and Total Capacity List	51
Table 2006-2013 Global Other Method Manufacturers Polysilicon Capacity Market Share List	51

Table 2006-2013 Global Other Method Manufacturers Polysilicon Production (Ton) and Total Production List	51
Table 2006-2013 Global Other Method Manufacturers Polysilicon Production Market Share List	52
Figure 2009-2013 Global Other Method Polysilicon Capacity Production (Ton) and Grow Rate	52
Table 2009-2013 Global Other Method Polysilicon Total Capacity Utilization Rate List	52
Table 2009-2013 Global Other Method Polysilicon Production (Ton) Purity (xN) ASP.Cost.Profit (\$/Kg) Production Value (Million \$) Profit Margin etc List	53
Table 2006-2013 Global Siemens FBR Physical Other Methods Polysilicon Capacity (Ton) and Market Share List	53
Table 2006-2013 Global Siemens FBR Physical Other Methods Polysilicon Production (Ton) and Market Share List	54
Figure 2006-2013 Global Polysilicon Total Capacity Production (Ton) and Grow Rate	54
Table 2006-2013 Global Polysilicon Total Capacity Utilization Rate List	55
Table 2006-2013 Global Key Manufacturers (35 units) Polysilicon Production (Ton) and Ranking List	55
Table 2006-2013 Global Key Manufacturers (35units) Production Market Share List	56
Table 2006-2013 EU US Japan Korea China Canada etc Countries Polysilicon Production (Ton) and Market Share List	57
Table 2006-2013 Global Key Manufacturers EG Polysilicon Production and Global Total Production (Ton) List	58
Figure 2006-2013 Global EG Polysilicon Total Production (Ton) and Grow Rate	59
Table 2006-2013 Global Key Manufacturers SG Polysilicon Production and Global Total Production (Ton) List	59
Figure 2006-2013 Global SG Polysilicon Total Production (Ton) and Grow Rate	61
Table 2006-2013 Global Solar Cell/Module.C-Si/Thin Film Production(GW) Solar Module/System ASP(USD/W) List	61
Table Jan 2008-Mar 2009 EU US Solar Module Retail Price (Euro/Watt)	62
Table 2006-2013 Global SG Polysilicon Demand (Ton) and Grow Rate	63
Table 2006-2012 Global EG Polysilicon Demand (Ton) and Grow Rate	64
Table 2006-2012 Supply Demand and Shortage (Ton) of Global Polysilicon	64
Table 2006-2013 China Key Manufacturers Polysilicon Capacity (Ton) and China Total Polysilicon Capacity List	66
Table 2006-2013 China Key Manufacturers Polysilicon Capacity Market Share	67
Table 2006-2013 China Key Manufacturers Polysilicon Production (Ton) and China Total Polysilicon Production List	68
Table 2006-2013 China Key Manufacturers Polysilicon Production Market Share	68
Figure 2006-2013 China Polysilicon Capacity Production (Ton) and Grow Rate	69
Table 2006-2013 China Polysilicon Total Capacity Utilization Rate List	69
Table 2006-2012 Supply Demand and Shortage (Ton) of China Polysilicon	70
Table 2006-2013 Siemens FBR Physical Other Methods Polysilicon Production Value and Global Total Production Value (Million \$) and Market Share	71
Table 2006-2013 Global Polysilicon Average Selling Price(\$/Kg) Trend	71

Table 2006-2013 Siemens FBR Physical Other Methods Polysilicon Purity Comparison	72
Table 2006-2013 Siemens FBR Physical Other Methods Polysilicon Cost (\$/Kg) Comparison	72
Table 2006-2013 Siemens FBR Physical Other Methods Polysilicon ASP (\$/Kg) Comparison	72
Table 2006-2013 Siemens FBR Physical Other Methods Polysilicon Profit Margin Comparison	73
Table 2006-2013 Global EG SG Polysilicon Cost ASP (\$/Kg) Profit Margin List	74
Tblae 2006-2013 China EG SG Polysilicon Cost ASP (\$/Kg) Profit Margin List	74
Table Hemlock Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	75
Figure Hemlock Siemens Method Polysilicon Manufacturing Process	79
Table 2005-2008 Hemlock Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	81
Table 2004-2013 Hemlock Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	82
Figure 2004-2013 Hemlock Polysilicon Capacity Production (Ton) and Grow Rate	84
Table 2006-2008 Hemlock Polysilicon Long Term Sales Agreements	84
Table Wacker Chemie AG Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	85
Table 2005-2008 Wacker Polysilicon Production (Ton) Revenue (Million Euro) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	87
Figure Wacker Polysilicon 5 Plant 650 Tons 8 Plant 7000+3000Tons 9 Plant 10000 Tons Commercial Production Time Table	88
Figure 2N-12N Purity Polysilicon Opposite Wafer Quality Comparison	92
Figure Wacker Trichlorosolane CVD Polysilicon Manufacturing Process (Closed Loops)	93
Figure Wacker HSiCL3 High Purity Si(Polysilicon) Process Chemical Equation	94
Figure Wacker Bell Jar Type Reactor (Polysilicon Reactor) and Manufacturing Process	94
Figure Wacker Stock Price (Euro) From Arp 13 2006- Mar 16 2009	95
Table 2007Q1-2008Q4 Wacker Polysilicon Quarterly Revenue EBIT (Million Euro) and EBIT margin	96
Table 2004-2013 Wacker Chemie AG Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	96
Figure 2004-2013 Wacker Polysilicon Capacity Production (Ton) and Grow Rate	97
Table 2006-2008 Wacker Chemie Polysilicon Long Term Agreements List	98
Table MEMC Electronic Materials Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	99
Table 2005-2008 MEMC Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	101
Figure MEMC Stock Price (USD) from Jul 21 1995-Mar 16 2009	103
Table 2003-2008 MEMC Revenue Profit (Million\$) and Profit Margin	103
Table 2004-2013 MEMC Electronic Materials Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	103
Table MEMC Siemens FBR Polysilicon Projects and Two Method Technical Comparison	104
Figure 2004-2013 MEMC Polysilicon Capacity Production (Ton) and Grow Rate	105
Table 2006-2008 MEMC Wafer Long Term Contracts List	105

Table REC Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	108
Figure May 8 2006-Feb 6 2009 REC Stock Price (NOK)	111
Table 2004-2013 REC Silicon Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	112
Table REC 6500Tons 1000Tons 4000Tons Three Expansion Projects Commercial Production Time Table	113
Table REC Siemens and FBR Polysilicon Method Comparison	114
Table REC and MEMC FBR Method Comparison	114
Figure 2004-2013 REC Silicon Polysilicon Capacity Production (Ton) and Grow Rate	116
Table 2007Q1-2008Q4 REC Polysilicon Quarterly Production (Ton) ASP (\$/Kg) Revenue (NOK) and EBITDA List	117
Table 2006-2008 REC Polysilicon ASP (\$/Kg) Production (Ton) Production Value Profit (Million\$) Cost (\$/Kg) Profit Margin List	118
Table REC Polysilicon Wafer(Nano Multi) Cell Module 2008Q4 Production and Annual Production	118
Table REC etc Global 7 Key Solar Companies Stock Price Comparison	119
Table 2007Q1-2008Q4 REC Polysilicon Production Sales (Ton) and Its In-house and Out-side Sales Ratio (%)	119
Table 2007-2009 REC Polysilicon Wafer Silicon Powder Long Term Contracts List	120
Table Tokuyama Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	123
Table 2005-2008 Tokuyama Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	125
Figure Tokuyama Stock Price (JPY) From Mar 30 2001-Mar 18 2009	126
Figure Tokuyama New 3000 Tons Polysilicon Plant	127
Figure Tokuyama Diagram of Production from Silica Stone to Polycrystalline Silicon and Finished Product	129
Table 2004-2013 Tokuyama Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	129
Figure 2004-2013 Tokuyama Polysilicon Capacity Production (Ton) and Grow Rate	131
Table Mitsubishi Materials Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	132
Table 2005-2008 Mitsubishi Materials Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	133
Figure Mitsubishi Materials Stock Price (JPY) From Feb 2007-Feb 2009	134
Table 2004-2013 Mitsubishi Materials Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	134
Figure 2004-2013 Mitsubishi Materials Polysilicon Capacity Production (Ton) and Grow Rate	135
Table Mitsubishi US Polysilicon Manufacturing Process	136
Table DC Chemical Co., Ltd Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	138
Figure DC Chemical Stock Price (Won) from Feb 2007-Feb 11,2009	139
Table Korea DCC No.1 No.2 No.3 Polysilicon Plants 26500 Tons Capacity Commercial	

Production Time Table 141

Table 2008-2013 DCC Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 143

Figure 2008-2013 DC Chemical Polysilicon Capacity Production (Ton) and Grow Rate 143

Table 2008-2013 DCC Polysilicon Capacity Utilization Long Term Contract Sales Spot Market Sales (Ton) Long Term Contract ASP (\$/Kg) Cost (\$/Kg) Revenue (Million\$) Profit Margin etc Information List 144

Table 2006-2008 Korea DC Chemical Some Long Term Polysilicon Sales Contracts List 144

Table M.SETEK Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 145

Table Japan M.SETEK 3000Tons 3000Tons Polysilicon Projects Commercial Production Time Table 149

Table 2007-2013 M.SETEK Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 149

Figure 2007-2013 M.SETEK Polysilicon Capacity Production (Ton) and Grow Rate 150

Table 2007-2013 M.SETEK Polysilicon Utilization Long Term Spot Market Own Use Quantity (Ton) Long Term Sport Market ASP (\$/Kg) Cost (\$/Kg) Production Value (Million \$) Profit Margin etc Information List 150

Table M.Setek Company Basic Information and Key Clients (Sanyo BP Suntech etc) List 153

Table 2006-2008 Japan M.SETEK Some Polysilicon Long Term Contracts 154

Table Osaka Titanium Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 155

Table 2005-2008 Osaka Titanium Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin 156

Figure Osaka Titanium Stock Price(JPY) from Mar 23,2007- Mar 19,2009 157

Table 2004-2013 Osaka Titanium Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 157

Figure 2004-2013 Osaka Titanium Polysilicon Capacity Production (Ton) and Grow Rate 159

Figure Osaka Titanium Polysilicon Manufacturing Process 160

Table Nitol Solar Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 162

Table Russia Nitol Solar 3800Tons Polysilicon Project Commercial Production Time Table 164

Table 2008-2013 Nitol Solar Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 165

Figure 2008-2013 Nitol Solar Polysilicon Capacity Production (Ton) and Grow Rate 166

Table 2008-2013 Nitol Solar Polysilicon Utilization Long Term Sales Spot Market Sales (Ton) Long Term and Spot Market ASP (\$/Kg) Cost (\$/Kg) Revenue (Million\$) Profit Margin etc Information List 166

Table 2007-2008 Nitol Solar Some Polysilicon Long Term Contracts List 167

Table GCL Silicon Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 168

Table 2007-2008 GCL Silicon Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin 169

Table GCL Silicon 1500Ton 1500Ton 10500Ton Projects Commercial Production Time Table 170

Table 2007-2013 GCL Silicon Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	171
Figure 2007-2013 GCL Silicon Polysilicon Capacity Production (Ton) and Grow Rate	172
Table 2009-2013 GCL Silicon Polysilicon Utilization Sales (Ton) ASP (USD/Kg) Cost (USD/Kg) Revenue (Million\$) Profit Margin etc Information List	172
Table 2007-2008 GCL Silicon Some Long Term Polysilicon/wafer Sales Contracts List	173
Table SINO-SI Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	173
Table 2005-2008 SINO-SI Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	176
Table 2008Q1-Q4 China Local Polysilicon Quarterly Selling Price (RMB/Kg)	177
Table 2009-2013 SINO-SI Polysilicon Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List	177
Table SINO-SI 2000Tons Polysilicon Project Investment Return Rate and Related Information	178
Table SINO-SI 300Ton 700Ton 2000Ton 2000Ton 5000Ton Projects Commercial Production Time Table	179
Table 2005-2012 SINO-SI Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	179
Figure 2005-2013 SINO-SI Polysilicon Capacity Production (Ton) and Grow Rate	180
Table 2007-2008 SINO-SI Some Polysilicon Sales Contracts	183
Table Sichuan Xinguang Silicon Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	185
Table Shareholding Structure of Xinguang Guiye (First Phase Project)	187
Table Xinguang Guiye Directorate Number List (First Phase Project)	187
Table Jan-Dec 2008 Xinguang Silicon Polysilicon Monthly Output (Ton)	188
Table 2007-2008 Xinguang Silicon Polysilicon Production (Ton) Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin	188
Table Xinguang Silicon Second Phase 6000 Tons(Xinjing Leshan 3000Tons)Project Shareholding Structure	189
Table Xinguang Silicon 1260Ton 3000Ton 3000Ton Projects Commerical Production Time Table	189
Table 2007-2013 Xinguang Silicon Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	190
Figure 2007-2013 Xinguang Silicon Polysilicon Capacity Production (Ton) and Grow Rate	191
Table 2009-2013 Xinguang Silicon Polysilicon Capacity Utilization Sales(Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List	191
Table China Chengda Engineering (Designer) Related Polysilicon Projects Partner	192
Table DEC Emei Semiconductor Materials Plant Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	194
Table DEC Emei Semiconductor 200Ton 500Ton 3*1500Ton Polysilicon Projects Commercial Production Time Table	196
Table DEC Emei Semiconductor Materials Plant 500Tons IC Polysilicon Project Investment Return Information List	197
Table 2005-2008 DEC Emei Semiconductor Materials Plant Polysilicon Production (Ton)	

Revenue (Million \$) ASP (\$/Kg) Cost (\$/Kg) Profit Margin 198

Table 2004-2013 DEC Emei Semiconductor Materials Plant Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 198

Figure 2004-2013 DEC Emei Semiconductor Materials Plant Polysilicon Capacity Production (Ton) and Grow Rate 199

Table 2009-2013 DEC Emei Semiconductor Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 199

Table Chongqing Daqo New Energy Co.,Ltd Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 200

Table Daqo Group 1500T 1800T 6000T 6000T Projects Commerical Production Time Table 202

Table Daqo Group Polysilicon Project Capacity,Technology Source,Investors,Contacts etc Information List 202

Table 2008-2013 Daqo Group Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 203

Figure 2008-2013 Daqo Group Polysilicon Capacity Production (Ton) and Grow Rate 204

Table 2008-2013 Daqo Group Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 204

Table Yongxiang Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 205

Table Yongxiang Polysilicon 1000T 3000T 6000T Polysilicon Projects Commercial Production Time Table 207

Table 2008-2013 Yongxiang Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 207

Figure 2008-2013 Yongxiang Polysilicon Capacity Production (Ton) and Grow Rate 207

Table 2008-2013 Yongxiang Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 208

Table Shunda Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 208

Table Shunda Polysilicon 1500T 1500T 3000T Polysilicon Projects Commercial Production Time Table 210

Table 2008-2013 Shunda Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 211

Figure 2008-2013 Shunda Polysilicon Capacity Production (Ton) and Grow Rate 211

Table 2008-2013 Shunda Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 211

Table Jiangsu Tehua Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 212

Table Jiangsu Tehua Polysilicon 500T 500T Polysilicon Projects Commercial Production Time Table 213

Table 2008-2013 Jiangsu Tehua Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 213

Figure 2008-2013 Jiangsu Tehua Polysilicon Capacity Production (Ton) and Grow Rate 214

Table 2008-2013 Jiangsu Tehua Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 214

Table Jiangsu Sunshine Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	215
Table Sunshine Polysilicon 1500T 3000T Polysilicon Projects Commercial Production Time Table	217
Table 2008-2013 Sunshine Polysilicon Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	217
Figure 2008-2013 Sunshine Polysilicon Capacity Production (Ton) and Grow Rate	218
Table 2008-2013 Sunshine Polysilicon Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List	218
Figure Sunshine Polysilicon Manufacturing Process Flow	220
Table JiangxiTn Silicon Material Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	220
Table JiangxiTn Silicon Material 500T 3000T 3000T 3000T Polysilicon Projects Commercial Production Time Table	224
Table 2008-2013 JiangxiTn Silicon Material Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	224
Figure 2008-2013 JiangxiTn Silicon Material Polysilicon Capacity Production (Ton) and Grow Rate	225
Table 2008-2013 JiangxiTn Silicon Material Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List	225
Table CSG Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	226
Table CSG Polysilicon 1500T 3000T Polysilicon Projects Commercial Production Time Table	229
Table 2009-2013 CSG Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	230
Figure 2009-2013 CSG Polysilicon Capacity Production (Ton) and Grow Rate	230
Table 2009-2013 CSG Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List	230
Table Asia Silicon Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	232
Table Asia Silicon 1000T 1000T 2000T 2000T Polysilicon Projects Commercial Production Time Table	234
Table 2009-2013 Asia Silicon Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	234
Figure 2009-2013 Asia Silicon Polysilicon Capacity Production (Ton) and Grow Rate	235
Table 2009-2013 Asia Silicon Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List	235
Table LDK Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes)	236
Table LDK 1000T 15000T Polysilicon Projects Commercial Production Time Table	239
Table 2009-2013 LDK Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List	240
Figure 2009-2013 LDK Polysilicon Capacity Production (Ton) and Grow Rate	240
Table 2009-2013 LDK Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg)	

Revenue (Million \$) Profit Margin etc Information List 240

Table Hoku Materials Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 241

Figure Hoku Stock Price From Aug 12 2005-Mar 25 2009 243

Table US Hoku Materials 4000T Polysilicon Projects Commercial Production Time Table 243

Table 2009-2013 Hoku Materials Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 243

Figure 2009-2013 Hoku Materials Polysilicon Capacity Production (Ton) and Grow Rate 244

Table 2009-2013 Hoku Materials Polysilicon Utilization Long Term Sales Spot Market Sales (Ton) Long Term and Spot Market ASP (\$/Kg) Cost (\$/Kg) Revenue (Million\$) Profit Margin etc Information List 244

Table 2007-2008 US Hoku Materials Some Long Term Contracts List 245

Table Polysilicon Manufacturing Process Comparison of SRI Method and Siemens Method 246

Table MutoSilicon 5000T Polysilicon Projects Commercial Production Time Table 247

Table Top Green Energy Technologies 1500T 1500T Polysilicon Projects Commercial Production Time Table 249

Table Fuju Solar 5000T Polysilicon Projects Commercial Production Time Table 251

Table Italy Silfab 3000T 2000T Polysilicon Projects Commercial Production Time Table 254

Table SILFAB Some Polysilicon Long Term Sales Contracts 255

Table Canada BSI Physical Method UMG Silicon Product Specification 258

Table Canada Timminco UMG 7200T 7200T Physical Polysilicon Projects Commercial Production Time Table 265

Table 2009-2013 Timminco UMG Silicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 265

Figure 2008-2013 Timminco UMG Silicon Capacity Production (Ton) and Grow Rate 266

Table 2008-2013 Timminco UMG Silicon Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 266

Figure WOONGJIN POLYSILICON Siemens Manufacturing Process 267

Table Korea WOONGJIN POLYSILICON 5000T 10000T Polysilicon Projects Commercial Production Time Table 269

Table Korea KMA 3000T Polysilicon Projects Commercial Production Time Table 270

Table US AE Polysilicon 1500T Polysilicon Projects Commercial Production Time Table 271

Table Italy ESTELUX 4000T Polysilicon Projects Commercial Production Time Table 272

Table Ukraine “Semiconductor Plant” JSC 2500T 5000T Polysilicon Projects Commercial Production Time Table 278

Table Russia Ukraine about 10 Building Projects Related Information List 278

Table Norway NorSun 3000T Polysilicon Projects Commercial Production Time Table 282

Table Australia Prime Solar 5000T 10000T Polysilicon Projects Commercial Production Time Table 283

Table France Silicium de Provence 4500T 9000T Polysilicon Projects Commercial Production Time Table 284

Table Spain Silicio Energia 2500T Polysilicon Projects Commercial Production Time Table 285

Table 2009-2013 Spain Silicio Energia Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 285

Table 2009-2013 Spain Silicio Energia Polysilicon Capacity Production (Ton) and Grow Rate 286

Table 2009-2013 Spain Silicio Energia Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 286

Figure Jan-Dec 2009 Elkem Solar UMG Silicon Monthly Output (Ton) 288

Table Norway Elkem Solar 5000T 5000T Physical Polysilicon Projects Commercial Production Time Table 288

Table 2009-2013 Norway Elkem Solar Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 288

Figure 2009-2013 Norway Elkem Solar Polysilicon Capacity Production (Ton) and Grow Rate 289

Table 2009-2013 Norway Elkem UMG Silicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 289

Table US Dow Corning 3000T 3000T 4000T Physical Polysilicon Projects Commercial Production Time Table 290

Table 2007-2013 US Dow Corning UMG Silicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 291

Figure 2007-2013 Dow Corning UMG Silicon Capacity Production (Ton) and Grow Rate 291

Table 2007-2013 Dow Corning UMG Silicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 291

Table 2009-2013 ARISE Technologies UMG Silicon Capacity Production (Ton) List 294

Table 6N Silicon Physical Method and Siemens Method Comparison 298

Table Nano/Multi SG-Si Require of Boron and Phosphorus 298

Table 6N Silicon 2000T UMG Silicon Project Commercial Production Time Table 299

Table 2009-2013 Canada 6N Silicon UMG Silicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 299

Figure JFE Steel UMG Silicon Manufacturing Process 301

Table Holand The Silicon Mine (TSM) 4000T Polysilicon Projects Commercial Production Time Table 303

Table 2009-2013 Holand The Silicon Mine (TSM) Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 304

Figure 2009-2013 Holand The Silicon Mine Polysilicon Capacity Production (Ton) and Grow Rate 304

Table 2009-2013 Holand The Silicon Mine Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 304

Table UK PV Crystalox 900T 900T Polysilicon Projects Commercial Production Time Table 306

Table 2009-2013 UK PV Crystalox Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 306

Figure 2009-2013 UK PV Crystalox Polysilicon Capacity Production (Ton) and Grow Rate 307

Table 2009-2013 UK PV Crystalox Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 307

Table India Bhaskar Silicon 2500T 2500T Polysilicon Projects Commercial Production Time Table 308

Table US RSI Silicon 1000T 29000T Polysilicon Projects Commercial Production Time Table 309

Table Siemens FBR Physical RSI etc Four Method Manufacturing Process Comparison 310

Table Hemlock Wacker REC MEMC RSI etc 5000Tons Project Product Cost Comarison 311

Table Siemens FBR Physical etc Six Methods Polysilicon Manufacturing Process Comparison 312

Table 2009-2013 RSI Silicon 6N Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 314

Figure 2009-2013 RSI Silicon 6N Polysilicon Capacity Production (Ton) and Grow Rate 315

Table 2009-2013 RSI Silicon 6N Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 315

Table Shenzhou Silicon Polysilicon Company Information List (Products Revenue Raw Materials Equipments Customers Expansion etc 13 Itmes) 316

Table Shenzhou Silicon 1500T 3000T Polysilicon Projects Commercial Production Time Table 318

Table 2009-2013 Shenzhou Silicon Polysilicon Capacity Production (Ton) and EG SG Polysilicon Production (Ton) List 318

Figure 2009-2013 Shenzhou Silicon Polysilicon Capacity Production (Ton) and Grow Rate 318

Table 2009-2013 Shenzhou Silicon Polysilicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 319

Table Wuxi Zhongcai 300T 3000T Polysilicon Projects Commercial Production Time Table 320

Table Renen Silicon Material 3000T 3000T Polysilicon Projects Commercial Production Time Table 321

Table Yongwang Silicon 300T 300T 3000T Polysilicon Projects Commercial Production Time Table 323

Table CICO 1500T 1500T 2000T Polysilicon Projects Commercial Production Time Table 324

Table Jiangxi Jingda 100T 1000T Polysilicon Projects Commercial Production Time Table 325

Table Shanxi Lu'an Grou 2500T 2500T Polysilicon Projects Commercial Production Time Table 327

Table Germany Centrotherm CVD Siemens Reactor Specification 328

Table US GT SOLAR SDR-100/SDR-200 Polysilicon Reactor Specification 330

Table US GT SOLAR Polysilicon Reactors Key Clients List 331

Table Germany MSA Polysilicon Reactors Key Clients List 332

Figure GT SOLAR Centrotherm MSA Three Reactor Vendors Reactor Market Share 332

Table Kunming Yeyan 3000T Polysilicon Projects Commercial Production Time Table 334

Table TBEA 1500T Polysilicon Projects Commercial Production Time Table 335

Table Dalu Polysilicon Project Capacity.Technology Source.Investors.Equipments Source etc Information List 340

Table PPP-E Polysilicon Reactor Specification 341

Table Nanjing Dalu Group 2500T 5000T 10000T Polysilicon Projects Commercial Production Time Table 348

Table 2008-2013 JACO SOLARSI UMG Silicon Capacity Utilization Sales (Ton) ASP (\$/Kg) Cost (\$/Kg) Revenue (Million \$) Profit Margin etc Information List 363

Table China Siemens Physical 1000T/A Project Comparison 364

Table Jinhua Smelting Polysilicon Project Capacity,Technology Source, Investors,Contacts etc Information List 368

Table DTK Silicon Long Term Polysilicon Sales Contracts 369

Table DTK Silicon 2500T Polysilicon Projects Commercial Production Time Table 370

Table 2009 China Polysilicon Project Opportunity and Risk List 370

Table 1500T/A Polysilicon Project(Siemens Method) Investment Feasibility Analysis 372