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Suntech Power Holdings: How to avoid bankruptcy[[1]](#endnote-1)

Daniel Han Ming Chng and Ziqian Zhao wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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On many occasions, Shi Zhengrong, the founder, former chairman, and chief executive officer (CEO) of Suntech Power Holdings Co. Ltd. (STP), expressed his belief that his company was “built-to-last.”[[2]](#endnote-2) Exploiting favourable global demands for renewable energy, the company grew from being one of many technological start-ups in China in 2001 to the leading global producer of photovoltaic solar cells and modules in 2011 (see Exhibit 1). However, in early 2013, STP’s wholly owned subsidiary in China, Wuxi Suntech Power Co. Ltd. (Wuxi Suntech), which accounted for nearly 95 per cent of the company’s products,[[3]](#endnote-3) was struggling to repay a five-year convertible bond worth over US$541 million to nine creditor banks in China. [[4]](#endnote-4) Its stock price had fallen to under $1 from a peak of $90 in 2008. Looking at the dramatic rise and fall of STP, what could Shi do to turn the company around and avoid bankruptcy?

The Solar Energy Industry

The science of converting sunlight into electricity was discovered in the 19th century, and the first solar cell,[[5]](#endnote-5) made of crystalline silicon, was invented in 1953. However, the high cost and low conversion efficiency[[6]](#endnote-6) prevented its popular use. The global energy crisis in the 1970s compelled many developed countries to consider the gradual substitution of traditional energy sources (e.g., coal and petroleum) with new, alternative energy sources, including solar energy. Technological advances improved the conversion efficiency of solar cells, and many developed countries like the United States, Germany, and Japan started to introduce subsidy schemes to support solar energy in the late 1990s. Consequently, the global solar energy industry began to take off (see Exhibit 2).

The solar energy industry value chain involved five segments: (1) solar-grade silicon, (2) silicon components (e.g., wafers), (3) solar cells, (4) solar modules (i.e., arrays of solar cells), and (5) solar power systems. Until 2008, the supply of solar-grade silicon was the bottleneck in the industry. Although silicon was not rare, in the early 2000s, the core technology for mass production of highly purified silicon (purity level over 99.999 per cent) was controlled by a few multinational corporations in the United States, Europe, and Japan, making this the most profitable segment in the industry.

To reduce cost, solar energy companies kept searching for new technologies that could increase the conversion efficiency of solar cells. Two technological directions were pursued in the late 1990s—the mainstream wafer technology and the new thin-film technology. Improvements in conversion efficiency by 1–2 per cent could significantly bring down the cost of production and increase the profit margins of solar companies. Although the thin-film technology minimized silicon use and offered greater applications (e.g., installation on the facade of buildings), its conversion efficiency was considerably lower.[[7]](#endnote-7) As a result, this technology was not as widely commercialized as the mainstream wafer technology.

Between 2000 and 2010, the global solar energy industry growth rate increased from 30 per cent to 40 per cent (see Exhibit 3). These impressive growth rates were driven by concerns about energy shortage, environmental pollution, and the dangers of nuclear power plants, particularly in developed countries. These countries’ governments had implemented strong subsidy programs before 2010 to support the emerging solar energy companies in the hope that technological advancement and scale economics could reduce user cost and establish a viable alternative form of energy.

The Inception of Wuxi Suntech power co. ltd. (wuxi suntech): 2001–2004

Shi was born in 1963 to a poor family who could not afford to raise him, and he was adopted by a better-off but childless family. Since childhood, Shi had studied hard to prove himself. One of his doctoral classmates remembered him saying that his name would one day be in the world’s top academic journals.[[8]](#endnote-8) In 1992, he completed his doctoral degree in electrical engineering at the University of New South Wales, Australia. Under the guidance of Professor Martin Green, the “father of photovoltaics” and winner of the Right Livelihood Award (also known as The “Nobel” Environmental Prize),[[9]](#endnote-9) Shi did his research on thin-film solar technology and developed 15 patents, which helped Pacific Solar, a Sydney-based company started by Green, to secure an initial investment of $50 million. Shi became the associate research director of Pacific Solar and headed its research on thin-film technology.[[10]](#endnote-10)

In the mid-1990s, the Chinese government began efforts to convince overseas-educated Chinese professionals with advanced technical skills to return to China, and Shi began to keep a close eye on opportunities there.[[11]](#endnote-11) In 2000, Shi decided to go back to China to become an entrepreneur, even though he had become an Australian citizen, had a high paying job, and owned properties in Australia. He presented his business idea for a solar energy company to many Chinese government officials and companies’ top executives, stating, “Give me $8 million; I will give you one of the world’s largest companies.”[[12]](#endnote-12) However, potential investors were reluctant to do so. As a former senior government official responsible for investments recalled, “We were aware of the huge risks involved in the investment. Because China had an energy oversupply in 2000, we did not see much domestic demand, nor did we understand the international market. The business potential was unclear.”[[13]](#endnote-13)

In October 2000, Shi met several top officials of Wuxi[[14]](#endnote-14) municipal government, who had recently set up a state-owned venture capital firm to promote high-tech start-ups in the city and were eager to create a success case. After conducting due diligence, the Wuxi municipal government invested in the new venture and appointed Shi as CEO. To finance the new venture, senior government official, Li Yanren, who later became chairman of the new company, visited many Wuxi state-owned enterprises (SOEs). Under pressure, six of them, including an electrical appliance company, a pharmaceutical company, and an equipment manufacturing company, agreed to invest $6 million. A senior executive from one of them commented, “Most of us were prepared [to expect] that the investment would simply be money down the drain.” [[15]](#endnote-15)

Shi personally invested $0.4 million and his core solar cell technology, valued at $1.6 million, in exchange for a 25 per cent stake in the new company with a further 5 per cent in a stock option plan. The new company, Wuxi Suntech, was launched in September 2001. Within a year, its first production line, with an annual capacity of 15 megawatts (MW), was completed. This capacity matched the total production of all Chinese solar cell producers over the last four years.[[16]](#endnote-16) The conversion rate of the company’s solar cell matched the world’s most advanced level at that time. Although the company suffered an initial loss in its first year of operation, it managed to secure orders from Germany, Japan, and the Netherlands.

Rapid Expansion and initial public offering (IPO): 2004 to 2008

Capacity Expansion

Favourable energy policies in developed countries, like Germany’s amended *Renewable Energy Act*, caused global demand for solar energy to increase rapidly. Encouraged by initial overseas orders and the fast-growing global market, Shi wanted to expand capacity by building a second production line in June 2003. He hoped to exploit the company’s early-mover advantage to achieve economies of scale so as to secure silicon supply and reduce overall cost. However, the board of directors rejected his proposal three times citing a lack of capital for expansion. Nevertheless, Li was able to use his government connections to secure a bank loan of ¥50 million[[17]](#endnote-17)($8.15 million) for the company to purchase a second-hand production line from a bankrupt Japanese company in 2004. This allowed the company to meet customers’ growing orders. As more orders were secured, Wuxi Suntech quickly invested in four additional production lines before the end of 2005 (see Exhibit 4). By year-end 2006, although STP became one of the top three photovoltaic players in the world, Shi saw his own company as a small player trying to catch up.[[18]](#endnote-18) Whereas most competitors struggled to meet growing demands, Wuxi Suntech was able to reap the benefits of its increased capacity.[[19]](#endnote-19) From 2002 to 2005, the company’s revenue increased from $3 million to $226 million and net income turned from a loss of $0.9 million to a profit of $30.6 million. Given the huge global market potential and the company’s shortage of funds, Shi started to explore the option for an initial public offering (IPO) in 2004.

IPO: New York Stock Exchange (NYSE) December 2005

To prepare for an IPO and to attract global investors, Shi wanted the Wuxi SOE-investors to exit Wuxi Suntech. However, with business prospering, all of them refused. Frustrated, Shi gave an ultimatum to the Wuxi municipal government threatening that he would leave the company otherwise. Seeking to position Wuxi Suntech as an exemplar of the government’s success in developing world-class companies, the Wuxi municipal government relented.[[20]](#endnote-20) By April 2005, all Wuxi SOEs shareholders sold their shares in the company. Although the Wuxi municipal government ceased to directly influence the business from this point onward, it remained a strong supporter of Wuxi Suntech because of the company’s contributions to the local economy and the city’s growing reputation as a centre of excellence for nurturing new enterprises in China. In December 2005, STP, through a British Virgin Islands (BVI) offshore vehicle, became the first private Chinese company to float on the New York Stock Exchange (NYSE), raising nearly $400 million. Shi’s ownership in STP rose to 46.8 per cent. He took on the role of chairman of the board of directors in addition to his role as CEO. Rising stock prices made him the seventh richest person in Forbes’s 2006 Chinese rich list,[[21]](#endnote-21) and he was dubbed the “Sun King” by Forbes Asia.[[22]](#endnote-22)

New Entrants

As global demand continued to increase from the mid-2000s, many new entrants emerged in Asia, including China, Taiwan, and South Korea. The core solar technology was well established, production lines and products were standardized, and financial resources for this industry became readily available. The success story of Wuxi Suntech and Wuxi city enticed many Chinese local governments to follow suit.[[23]](#endnote-23) For example, LDK Solar Co. Ltd., supported by the Jiangxi provincial government, was founded in 2005 and went public on the NYSE in 2007. Taking advantage of lower production costs in China, Chinese solar companies quickly became major producers in the world (see Exhibit 5). This made Shi even more aggressive. He felt that if STP slowed down, new Chinese companies, supported by various local governments, would be able to quickly overtake STP.

New Technologies

To meet competition, STP invested heavily in new technologies. In 2007, building on Shi’s expertise in thin-film technology, the company invested $50 million in a new thin-film production line in Shanghai. At that time, thin-film technology had a conversion efficiency of only 7 per cent compared to at least 14 per cent for the mainstream wafer technology. Still, the high cost of silicon made thin-film solar products viable. Besides thin-film technology, STP also invested heavily in the pursuit of next-generation wafer technology in 2007 to improve the conversion efficiency of its core products. The company was able to achieve 18–19 per cent conversion efficiency in its pilot production. Anticipating new demand for these high efficiency solar cells, STP accelerated plans to retrofit existing production lines by the end of 2009.

Strategic Alliances to Stabilize Silicon Supply

Until 2008, the global supply of solar-grade silicon was limited. The price of silicon increased from $90 per kilogram in 2004 to $475 per kilogram in March 2008 (see Exhibit 6). STP had to import the majority of its silicon from suppliers in developed countries as domestic supply in the early 2000s was low. The accepted belief was that whoever had a secured silicon supply would win in this business.To stay ahead of competition, STP established several strategic alliances to ensure a stable and reliable supply of silicon. In 2004, it provided financial loans to its suppliers to build two local silicon and silicon component factories.

In addition, STP signed a 10-year supply contract in 2006 with MEMC Electronic Materials Inc. (MEMC), a major U.S. supplier, worth $6 billion. The agreement locked in an initial price of $100 per kilogram (which was lower than the spot market price)[[24]](#endnote-24) subject to a declining annual price curve in subsequent years. The deal seemed quite good considering the black market price for silicon in China was around $400 per kilogram in 2007. However, some managers were uncomfortable with these deals because they involved significant risks such as locked-in prices and non-competition clauses that forbade STP from making future upstream investments.[[25]](#endnote-25)

The Integrated Value Chain Strategy

Until the mid-2000s, Wuxi Suntech was cautious about making investments in upstream silicon production, preferring to focus on the production of solar cell and module. As Shi explained, “If a new technology comes to the market, what could we do with the silicon factories?”[[26]](#endnote-26) However, he came to realize that the long-term supply contracts could affect STP’s strategic flexibility. Consequently, in its second five-year strategic plan (2007–2012), the company decided to develop an integrated industry value chain by 2012, including upstream silicon processing, to secure and stabilize silicon supply, and downstream solar energy systems, to create internal demands for its solar cells and modules. To finance these heavy fixed-asset investments along with planned capacity expansion, Wuxi Suntech[[27]](#endnote-27) issued convertible bonds to qualified institutional buyers (mainly Chinese banks) in February 2007 worth $500 million (at 0.25 per cent, due 2012) and in March 2008 worth $525 million (at 0.3 per cent, due 2013). Many Chinese solar energy companies, like Yingli Solar, also followed similar strategies in capacity expansion and vertical integration. In addition, STP invested $100 million in March 2008 to acquire a minority stake in Nitol Solar, a Russian producer of silicon wafers, and $81 million in Asia Silicon Co. Ltd. (Asia Silicon), a Chinese producer of silicon products, in January 2009, Asia Silicon quickly became STP’s top silicon supplier.[[28]](#endnote-28)

Internal Management

As STP grew from a small start-up to one of the world’s leading solar energy companies, Shi had to also transform himself from a scientist to an entrepreneur, and eventually, to a top executive of a global company. These changes were challenging for Shi, who reflected,

When Suntech was just a start-up, work processes and finding enough talents did not bother me because I could see through things immediately, and I could do anything needed by myself. The company was fine, and I was not too stretched by the job. But as the company grew big, it became more heavily reliant on processes and qualified talents, [of] which we didn’t have enough, forcing me to continue to take care of every little detail. I felt exhausted and the company suffered.[[29]](#endnote-29)

As a former executive commented, “Many of Shi’s decisions were extremely arbitrary, and he might change them quickly afterwards. But when he made up his mind, he could hardly be influenced by others.”[[30]](#endnote-30) The thin-film investment and long-term supply contract with MEMC were two examples.[[31]](#endnote-31) After its IPO, Shi recruited several senior executives from renowned multinational companies like BP, Siemens, and Bayer.[[32]](#endnote-32) He built a large international management team with over 20 vice-presidents, many with generous compensation packages.[[33]](#endnote-33) In the minds of many local Chinese managers who had been there since the beginning of Wuxi Suntech, these top management positions could have been filled by them. They became frustrated by what they felt was a “glass ceiling”[[34]](#endnote-34) and commented, “We were also entrepreneurs. We helped him reach the top, but we were treated as expendable. We were denied a sense of belonging.”[[35]](#endnote-35)

Global Financial Crisis and Post-Crisis Reorganization: 2008 to 2010

Silicon Oversupply

Soaring silicon prices in the early 2000s motivated many Chinese companies to enter the upstream segments in the mid-2000s. The massive entry of Chinese companies disrupted the global silicon supply structure. Signs of oversupply began to show in the second half of 2008, and silicon prices dropped sharply from $417 per kilogram in August to $219 per kilogram in December. Prices continued to drop every year after that to only $80 per kilogram in 2010 (which was lower than STP’s long-term contract price with MEMC).

Changing Market Conditions and STP’s Outlook in 2009

The unexpected global financial crisis in 2008 presented many European governments with more important economic and social issues to address, and many decided to reduce the financial support toward renewable energy. In 2008, Europe accounted for nearly 80 per cent of the global solar energy market, with Germany and Spain accounting for nearly half of that. As STP was exporting over 90 per cent of its products to overseas markets, primarily Europe, its sales were adversely affected. Even though market conditions were less favourable at the end of 2008, STP remained optimistic as the business was still profitable and revenue and gross margin in Q2 2009 actually improved.The good news was perceived by many industry players as an early sign of global economic recovery.[[36]](#endnote-36) Shi saw the silicon oversupply condition as “a phase that shall pass”[[37]](#endnote-37) and, encouraged by the positive result, he continued to expand production capacity to become the world’s leading solar energy company in terms of capacity in 2010. Many Chinese solar energy companies made similar decisions, leading Charles Annis, DisplaySearch’s vice president of manufacturing research, to warn in mid-2000,

Despite PV [photovoltaic] module demand shrinking 17 per cent in 2009, so much cell manufacturing equipment was ordered and installed over the past year that capacity is still expected to grow 56 per cent this year. With demand and capacity moving in different directions, the PV industry is currently experiencing an enormous over-supply that is causing rapid price erosion and potentially setting the stage for the failure of multiple cell manufacturers.[[38]](#endnote-38)

Decline in Sales and Profit Margin

The improvements in mid-2009 for the industry did not continue. Instead, the market for solar energy declined further, and this caused the price of silicon to drop sharply. STP faced increased pressures on its revenues and costs as reduced global demand and excess global supply resulted in severe price competition. Heavy investments in specialized fixed-assets forced Chinese solar companies to reduce prices in order to win sales. With the largest production capacity in the world in 2010, STP’s fixed-costs were extremely high.

STP’s efforts in new technology also failed. Silicon prices dropped substantively, making the efforts to improve conversion efficiency for thin-film technology futile. STP had to abandon its thin-film technology, and its production line was written off in 2010 at a loss of $50 million. Customers were reluctant to accept the more advanced wafer technology as a better, but significantly more expensive, technology.

Changes to Upstream Strategies

As silicon prices fell (see Exhibit 7), STP proposed to adjust the contract price with MEMC. After protracted negotiations, STP was able to eventually terminate the contract with MEMC in July 2011 by paying a severance fee of $125 million. STP also agreed to short-term supply contracts with cheaper suppliers and stopped all prepayments and financial support to them. Meanwhile, STP also increased equity investment in the upstream silicon refinement business. The company increased its stake in Asia Silicon from 12.5 per cent to 20 per cent in October 2009. By mid-2011, further investments were made in American supplier, Hoku Scientific Inc.; Russian supplier, Nitol Solar; and two Chinese suppliers, Shunda Holdings and Xi’an Longji Silicon. In 2011, STP also bought 100 per cent stake of Rietech Solar[[39]](#endnote-39) as a platform to expand silicon wafer production. By the end of 2011, such affiliated companies were able to provide half of STP’s wafer supply.[[40]](#endnote-40) While these investments were made in view of reducing the cost of supplies, STP’s production cost per unit was still higher than average.[[41]](#endnote-41) In addition, questions about Shi’s relationship with several of STP’s key suppliers (including Asia Silicon and Rietech Solar) were raised by the media. [[42]](#endnote-42)

Downstream Strategy: Global Solar Fund (GSF)

STP formed and invested in Global Solar Fund (GSF) in 2008 as part of the vertical integration strategy.GSF was created to invest in the development and operation of solar energy power stations, particularly in Europe.[[43]](#endnote-43) Funding these projects normally required roughly 20 per cent from GSF and 80 per cent from bank loans. Once these power stations were put into operation, GSF could sell its stakes to interested investors and use the money to repay the bank loans. The strategic objective for STP was to create demand for its solar products and also to establish higher and more stable cash in-flow by operating solar power stations. STP’s total capital commitment in GSF was €258 million[[44]](#endnote-44) ($365 million), accounting for 86 per cent of the fund.[[45]](#endnote-45) Another 10.67 per cent was owned by Shi through another BVI company. The remaining 3.33 per cent was held by GSF’s manager Javier Romero.[[46]](#endnote-46) Without advanced financial expertise, Shi left the operations of GSF to Romero and his team.

Expanding Geographical Markets

After 2008, STP also decided to diversify its geographicalmarkets further (see Exhibit 8) to find new market opportunities. It increased efforts in the United States by building a manufacturing factory in Arizona to mitigate anti-dumping pressures. STP also started to look at the domestic Chinese market as environmental issues had become one of China’s biggest concerns. However, even after these new market initiatives, the European market still accounted for 74 per cent of STP’s total sales in 2009, with Germany accounting for close to 41.4 per cent.[[47]](#endnote-47)

Financing

To finance its strategic initiatives and fulfil existing loan obligations, STP issued a follow-on public offering and raised approximately $277 million and another round of convertible bonds worth $50 million (at a fixed rate at 5 per cent per annum) in 2009.[[48]](#endnote-48) STP’s bank loans, which totalled $560 million at the end of 2005, soared to $1.7 billion at the end of 2011—a 3-fold increase in less than seven years.[[49]](#endnote-49) Moreover, its cash flow became unstable after 2008 because of heavy fixed-asset investments and increasing fluctuations in the solar energy market (see Exhibit 9).

Crisis Years: 2011 to 2013

Anti-Dumping Actions in the United States and Europe

In 2011, anti-dumping investigations were initiated by the U.S. government, and duties of almost 36 per cent were imposed on the importation of China-made solar cells in November 2012.[[50]](#endnote-50) These heavy duties forced STP to close down its plant in Arizona.[[51]](#endnote-51) Similar anti-dumping investigations were initiated by the European Union in 2012, and a temporary duty on China-made solar modules was imposed in 2013. At that time, the European market accounted for 45 per cent and the United States for 20 per cent of STP’s total sales. These anti-dumping actions were serious blows to STP.[[52]](#endnote-52)

Global Solar Fund (GSF) Fraud Case

GSF’s business model required large loans from banks to support the building of solar power stations. With banks unwilling to provide loans, GSF had to rely on STP for funds, while STP in turn, had to rely on GSF to ensure the sales of its solar products. To secure bank loans, GSF fraudulently pledged over €500M in German government bonds it did not have (see Exhibit 10).[[53]](#endnote-53)When this fraud was revealed, STP was sued by shareholders in a class-action suit. STP’s global image was badly affected, and the company lost more than 40 per cent of its market value. Around the same time, the Italian court also filed criminal charges against GSF, accusing it of illegally building solar power plants to exploit government subsidy.[[54]](#endnote-54) These fraud charges raised serious doubts about STP’s business integrity and Shi’s management capabilities.

Financial Distress

Considering STP’s financial distress, as the chairman of the company’s board of directors and its largest shareholder (see Exhibit 11), what should Shi do to turn the company around and avoid bankruptcy?

Exhibit 1: Suntech power holdings’s Revenue and Net Profit Growth and Key Financial Data 2002–2011 ($ Millions)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **$ million** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| Net Revenues | 3.0 | 13.9 | 85.3 | 226.0 | 598.9 | 1,348.3 | 1,923.5 | 1,693.3 | 2,901.9 | 3,146.6 |
| Cost of Revenues | 2.9 | 11.2 | 60.2 | 157.4 | 450.0 | 1,068.6 | 1,573.7 | 1,331.3 | 2,358.8 | 2,760.0 |
| Gross Profit | 0.1 | 2.7 | 25.1 | 68.6 | 148.9 | 279.7 | 349.8 | 362.0 | 543.1 | 386.6 |
| Gross Margin  (per cent) | 3.3 | 19.4 | 29.4 | 30.4 | 24.9 | 20.7 | 18.2 | 21.4 | 18.7 | 12.3 |
| Net Income (loss) | (0.9) | 0.9 | 19.8 | 30.6 | 104.6 | 143.2 | 31.0 | 85.7 | 237.9 | (1,018.0) |
| Net Profit Rate | (30.0) | 6.5 | 23.2 | 13.5 | 17.5 | 10.6 | 1.6 | 5.1 | 8.2 | (32.4) |

Source: Suntech Power Holdings Co., Ltd., “Form 20-F,” EDGAR Online, accessed December 15, 2016, https://www.sec.gov/Archives/edgar/data/1342803/000095012310047699/h04216e20vf.htm.

Exhibit 2: Global Solar Cell Production Capacity 1977–2010 (Output in MWs)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **1977** | **1982** | **1983** | **1984** | **1985** | **1986** | **1987** | **1988** | **1989** |
| Output | 0.5 | 9.3 | 21.6 | 25.0 | 24.4 | 27.5 | 29.1 | 35.0 | 42.2 |
| **Year** | **1992** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** |
| Output | 57.6 | 69.6 | 77.6 | 88.6 | 126.0 | 155.0 | 201.0 | 288.0 | 391.0 |
| **Year** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| Output | 536.8 | 747.0 | 1,211.0 | 1,793.0 | 2,561.0 | 4,450.1 | 7,900.0 | 10,659.0 | 23,898.0 |

Note: Compound annual growth rate (CAGR) was 45.45 per cent.

Source: Zhu Jin Wei, Wu Yuan Yuan, Han Chao Hua, Chen Jia Gui, and Huang Qun Hui, *Investigation of Suntech Power: Internationalized Management of Emerging Industries with High Uncertainty,* Chinese ed. (Beijing: Economic Management Press, 2013), 5.

Exhibit 3: Global Solar Energy Industry Growth 2000–2010

**CAGR 2000-2007:** 30.87 per cent

**CAGR**

**2007-2010:**

45.73 per cent

Source: Zhu Jin Wei, Wu Yuan Yuan, Han Chao Hua, Chen Jia Gui, and Huang Qun Hui, *Investigation of Suntech Power: Internationalized Management of Emerging Industries with High Uncertainty,* Chinese ed. (Beijing: Economic Management Press, 2013), 97.

Exhibit 4: Suntech power holdings’s Production Lines and Aggregate Capacity 2002–2011

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| Aggregate capacity | 10 | 15 | 30 | 150 | 270 | 540 | 1,000 | 1,100 | 1,800 | 2,400 |
| Megawatt output | 0.9 | 6.4 | 29.5 | 67.7 | 159.6 | 363.3 | 494.4 | 681.9 | 1,539.0 | 2,066.2 |

Source: Suntech Power Holdings Co., Ltd., “Form 20-F,” EDGAR Online, accessed December 15, 2016, https://www.sec.gov/Archives/edgar/data/1342803/000095012310047699/h04216e20vf.htm.

Exhibit 5: Solar Cell Production by Region 2002–2010

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Countries** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| Japan | 252 | 365 | 604 | 833 | 926 | 920 | 130 | 150 | 218 |
| Europe | 122 | 200 | 311 | 472 | 680 | 106 | 200 | 193 | 312 |
| US | 120 | 103 | 138 | 153 | 179 | 266 | 432 | 595 | 111 |
| China | 6 | 12 | 50 | 145 | 438 | 108 | 260 | 401 | 106 |
| Taiwan | 0 | 0 | 0 | 0 | 0 | 450 | 900 | 118 | 352 |
| Others | 35 | 66 | 106 | 188 | 336 | 663 | 668 | 143 | 328 |
| Total | 535 | 746 | 1,209 | 1,791 | 2,559 | 2,513 | 2,590 | 1,600 | 1,427 |

Source: Zhu Jin Wei, Wu Yuan Yuan, Han Chao Hua, Chen Jia Gui, and Huang Qun Hui, *Investigation of Suntech Power: Internationalized Management of Emerging Industries with High Uncertainty,* Chinese ed. (Beijing: Economic Management Press, 2013), 6.

Exhibit 6: Spot Price of Polycrystalline Silicon 2004–March 2008

$/Kilo

CAGR: 39.5%

Year

Source: Zhu Jin Wei, Wu Yuan Yuan, Han Chao Hua, Chen Jia Gui, and Huang Qun Hui, *Investigation of Suntech Power: Internationalized Management of Emerging Industries with High Uncertainty,* Chinese ed. (Beijing: Economic Management Press, 2013), 66.

Exhibit 7: Spot Price of Polycrystalline Silicon March 2008–2012 ($/Kilo)

Source: Zhu Jin Wei, Wu Yuan Yuan, Han Chao Hua, Chen Jia Gui, and Huang Qun Hui, *Investigation of Suntech Power: Internationalized Management of Emerging Industries with High Uncertainty,* Chinese ed. (Beijing: Economic Management Press, 2013), 66.

Exhibit 8: Suntech power holdings’s Geographical Markets 2006–2011  
(per cent)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Countries** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| Germany | 42.5 | 50.9 | 29.7 | 41.4 | 28.2 | 20.1 |
| Spain | 20.6 | 34.6 | 37.4 | 3.6 | 3.0 | 1.4 |
| Italy | - | - | 6.1 | 11.8 | 16.3 | 4.8 |
| France | - | - | 0.5 | 6.4 | 7.7 | 7.6 |
| Benelux | - | 0.5 | 1.5 | 4.4 | 4.3 | 4.2 |
| Europe (other) | 7.3 | 2.7 | 2.5 | 6.4 | 6.6 | 7.4 |
| United States | 3.4 | 6.4 | 7.4 | 9.5 | 15.3 | 23.0 |
| China | 21.7 | 1.9 | 7.0 | 4.5 | 5.3 | 11.8 |
| South America | 0.3 | 0.1 | 0.1 | - | - | - |
| Australia | - | - | - | 2.0 | 4.1 | 4.3 |
| Japan | 0.7 | 0.6 | 0.3 | 4.8 | 4.6 | 4.6 |
| Others | 3.5 | 2.3 | 7.5 | 5.2 | 4.6 | 10.8 |
| Total Revenue | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Suntech Power Holdings Co., Ltd., “Form 20-F,” EDGAR Online, accessed December 15, 2016, https://www.sec.gov/Archives/edgar/data/1342803/000095012310047699/h04216e20vf.htm.

Exhibit 9: Suntech power holdings’s Cash Flow Indices 2003–2011 ($ millions)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Items** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **Avg.** |
| Operating CF | 0.7 | 2.6 | 22.6 | −150.0 | −9.0 | −171.0 | 292.9 | −30.0 | 93.3 | 5.8 |
| Investment CF | −3.0 | −13.0 | 31.1 | −154.0 | −241.0 | −642.0 | −442.0 | −239.0 | −568.0 | −252.2 |
| Financing CF | 3.6 | 28.1 | 348.0 | 172.7 | 547.0 | 795.2 | 479.4 | 303.0 | 102.1 | 308.8 |
| Cash & cash equivalent changes | 1.3 | 17.6 | 340.0 | −134.0 | 295.5 | −13.2 | 325.4 | 39.3 | −380.0 | 54.7 |
| Cash & cash equivalent at beginning of year | 0.3 | 1.6 | 19.1 | 359.3 | 225.5 | 521.0 | 507.8 | 833.2 | 872.5 | 371.1 |
| Cash & cash equivalent at end of year | 1.6 | 19.1 | 359.0 | 255.5 | 521.0 | 507.8 | 833.2 | 872.5 | 492.4 | 429.2 |

Source: Suntech Power Holdings Co., Ltd., “Form 20-F,” EDGAR Online, accessed December 15, 2016, https://www.sec.gov/Archives/edgar/data/1342803/000095012310047699/h04216e20vf.htm.

Exhibit 10: Details of the Global Solar Fund (GSF) Fraud Case

GSF’s business model required large loans from banks to support the building of solar power stations. After some initial support, many European banks hesitated to issue new loans to support GSF’s projects because of the significant risk in relation to the repayments of these bank loans if GSF were not able to sell these power stations immediately upon completion. Given that most investors would require seeing positive cash flow from power generation as a precondition for investing, GSF would have a hard time selling these solar power stations to investors immediately after completing these projects. With banks unwilling to provide loans, GSF had to rely on STP for more funds to operate those completed solar power stations as it searched for potential buyers. In turn, STP had to rely on GSF to invest in more solar power station projects in order to ensure the continued sales of its solar products.

To secure more funds in 2010, STP guaranteed payment obligations related to the finance facilities provided by China Development Bank to an investee company of GSF in the amount of approximately €554.2 million. To avoid STP’s taking on that liability, Romero, on behalf of GSF Capital Pte. Ltd., pledged to STP the same amount in German government bonds as collateral for the bank loan. However, in July 2012, it was uncovered that the German government bonds may not have existed at all. STP claimed to be a victim of fraud perpetuated by Romero and initiated a lawsuit. STP was sued by shareholders in a class-action suit after the revelation of the German bond-guarantee fraud, and the company lost more than 40 per cent of its market value. The fraud case cast doubts on STP’s business integrity and Shi’s management capabilities. The lawsuit was settled out of court in March 2013. Romero was removed from GSF, STP’s stake in GSF increased to 88.15 per cent, and Shi’s stake increased to 11.85 per cent.

Around the same time, the Italian court also filed criminal charges against GSF, accusing it of illegally building solar power plants to exploit government subsidy. Solar power stations in Europe relied heavily on governments’ subsidies to reach grid parity. With many European economies in recession, government subsidies had been significantly reduced, and the requirements for obtaining a subsidy had become more difficult. For example, the Italian government shortened the deadline for solar power stations to be completed and connected to the electrical grid. It also insisted that the subsidy level be decreased on a monthly basis prior to the deadline. Earlier in 2011, five GSF-invested companies had already been charged with illegal construction of solar power plants. Charges included the failure to obtain the correct permit to build solar power plants and falsifying completion time to meet the deadline in order to qualify for government incentives. The charges would eventually result in the dismantling of 37 solar power projects in Italy and added weight to questions over GSF’s affairs, the extent to which STP supervised it, and how much STP’s shareholders were informed about the magnitude of its troubles in Italy.

Source: “Suntech Investigates Security Interest In Connection with GSF,”PR Newswire, July 30, 2012, accessed December 15, 2016, www.prnewswire.com/news-releases/suntech-investigates-security-interest-in-connection-with-gsf-164235476.html; Steve Scherer and Stephen Jewkes, “China’s Fraud-Hit Suntech Strikes More Trouble in Italy,” Reuters: Business News, August 29, 2012, accessed September 18, 2015, www.reuters.com/article/us-suntech-italy-idUSBRE87S0N420120829; “Suntech Power in Peace with GSF,” *Securities Times*, March, 11, 2013, accessed December 15, 2016; Wayne Ma, “The Man at Center of Solar-Panel Maker Suntech’s Fall,” *Wall Street Journal: Asian Business News,* May 3, 2013, accessed December 15, 2016, https://www.wsj.com/articles/SB10001424127887324743704578442422720766046.

Exhibit 11: Shi Zhengrong and Other Principal Shareholders’ Stakes at STP

|  |  |  |
| --- | --- | --- |
| **Year** | **Shi Zhengrong**  **(per cent)** | **Other Principal Shareholders**  **(more than 5 per cent)** |
| 2006 | 44.97 | Jason E. Maynard (7.33) (Board member)  D&M Technologies Limited (44.75)  Goldman Sachs (Asia) Finance (7.32) |
| 2007 | 38.6 | D&M Technologies Limited (38.3)  FMR Corp (11.2)  Goldman Sachs Group, Inc. (7.1)  Goldman, Sachs & Co.(7.1) |
| 2008 | 34.2 | D&M Technologies Limited (33.6)  FMR Corp (11.2) |
| 2009 | 35.1 | D&M Technologies Limited (34.1)  Janus Capital Management LLC (8.4) |
| 2010 | 30.4 | D&M Technologies Limited (29.5) |
| 2011 | 30.4 | D&M Technologies Limited (29.5) |
| 2012 | 30.2 | D&M Technologies Limited (29.4) |

Source: Suntech Power Holdings Co., Ltd., “Form 20-F,” EDGAR Online, accessed December 15, 2016, https://www.sec.gov/Archives/edgar/data/1342803/000095012310047699/h04216e20vf.htm.

Endnotes

1. This case has been written on the basis of published sources only. Consequently, the interpretation and perspectives presented in this case are not necessarily those of Suntech Power Holdings Co. Ltd., or any of its employees. [↑](#endnote-ref-1)
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4. Shuyang Jin, “Wuxi Suntech 541 Million US Dollars Convertible Bonds to Determine the Default” [in Chinese], *STCN.com*, March 19, 2013, accessed on September 1, 2014, http://epaper.stcn.com/paper/zqsb/html/2013-03/19/content\_450723.htm. [↑](#endnote-ref-4)
5. A solar cell was a device made from a silicon wafer that converted sunlight into electricity. As long as light flowed into the solar cell, electricity would be generated. The solar cell did not lose its power as does a battery. [↑](#endnote-ref-5)
6. Conversion efficiency rates measured the ability of solar cells to convert sunlight into electricity.  [↑](#endnote-ref-6)
7. In 2005, the world average conversion efficiency rate of monocrystalline wafer solar cells ranged from 15 per cent to 18 per cent, and polycrystalline wafer solar cells had an efficiency of 14 per cent. By contrast, the average conversion efficiency for thin-film technology was only 7 per cent in 2010. [↑](#endnote-ref-7)
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14. Wuxi, approximately 120 kilometres west of Shanghai, was a city located in the southern Jiangsu province. It was recognized as one of the birthplaces of China’s modern industry and ranks in the top 10 prefecture-level cities by gross domestic product (GDP) per capita. [↑](#endnote-ref-14)
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26. “Suntech Died” [in Chinese], Netease, September 7, 2012, accessed June 18, 2014, http://money.163.com/12/0907/08/8APLQJVO00253G87.html. [↑](#endnote-ref-26)
27. Wuxi Suntech was the main entity used in securing loans for the listed STP from major Chinese banks because it controlled over 95 per cent of STP’s operational assets, which were used as collateral in China. [↑](#endnote-ref-27)
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33. Wang Siyuan, “Shi Zhengrong Fall” [in Chinese], Global Entrepreneur, March 21, 2013, accessed September 18, 2015, http://businessleaders.com.cn/8/31678\_1.html. [↑](#endnote-ref-33)
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39. Rietech Solar was a spin-off from Glory Silicon, reportedly founded in 2006 and ultimately controlled by Shi Zhengrong and his wife. [↑](#endnote-ref-39)
40. Hao Fengling, “Suntech” [in Chinese], Hexun.com: 21 Century Business Review, December 5, 2012, accessed September 1, 2014, http://stock.hexun.com/2012-12-05/148704346.html. [↑](#endnote-ref-40)
41. Ibid. [↑](#endnote-ref-41)
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52. “Twin Early Failure,” op. cit. [↑](#endnote-ref-52)
53. Wayne Ma, “The Man at the Center of Solar-Panel Maker Suntech’s Fall,” *Wall Street Journal: Asian Business News,* May 3, 2013, accessed July 4, 2017, https://www.wsj.com/articles/SB10001424127887324743704578442422720766046. [↑](#endnote-ref-53)
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