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IT TRANSFORMATION AT FIRST SOLAR

Creating a new, sustainable line of business.

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INDUSTRY ANALYSIS

ECONOMIC OVERVIEW

During much of 2009 and 2010, the alternative energy marketplace has been in a state of unpredictable change. The financial landscape is uncertain and profits are slim. Many companies are wondering if the journey to find alternative means for energy production is worth the investment. Wind, Hydro and Solar projects are all struggling to make ends meet in an economic landscape that predicts success but presents challenges. Strong, lean and agile companies seem to be able to maintain a slim competitive advantage afloat, while larger, slower companies are drowning in a myriad of intricate supply chains and non-existent credit. The following section looks at the current financial landscape for Alternative energy companies, with a focus on large scale, highly integrated solar providers.

The last few fiscal quarters have been rocky for all companies alike, and renewable energy has not been immune to the economic dragging of a bear market. In March of 2008 consumer confidence, (a direct reflection of consumer's ability to spend money), hit its lowest point in 5 years. So, despite commercial and residential consumers seeing the benefits solar power, there is a general lack of interest due to inability to fund new projects. In addition to consumers, many major institutional investors have decreased involvement with renewable energy investments. According to Hudson Clean Energy Partners, L.P. (as cited in SEIA, 2009), there is a trend by financial institutions to shield themselves from continued losses in response to global credit pressures. In a recent survey conducted for the American Recovery and Reinvestment Act (ARRA, 2008), 86% of renewable energy companies reported some kind of negative impact as a result of a poor economy. As a testament to the lack of capital in the energy market, 31% of employees who worked with companies in the renewable energy market reported downsizing or anticipating a downsize (SEIA, 2008).

However, there are some bright spots on the horizon. In 2009 President Barack Obama signed the American Recovery and Reinvestment Act (ARRA). This legislation includes several provisions aimed toward boosting green energy investments, with money for green projects and several tax incentives for companies who embrace 'Green' technologies. The legislation also includes 5.5 billion dollars for government procurement of energy efficiency and renewable energy projects. The President also approved the Emergency Economic Stabilization Act (EESA) that removes the $2,000 limit on residential electric systems and allows the credit to count toward an individual's annual Alternative Minimum Tax (AMT). Together, the ARRA and EESA attempt to provide the incentive for the U.S. alternative energy industry to reach its full potential through careful long-term planning and vision.

Despite recent setbacks, the global solar energy industry has seen rapid expansion in the last decade. The demand for Photovoltaic Modules has increased, total shipments of PV cells and modules increased more than 90 percent in 2008 (Source: U.S. Energy Information Administration (EIA), Form EIA-63B, "Annual Photovoltaic Module/Cell Manufacturers Survey.")

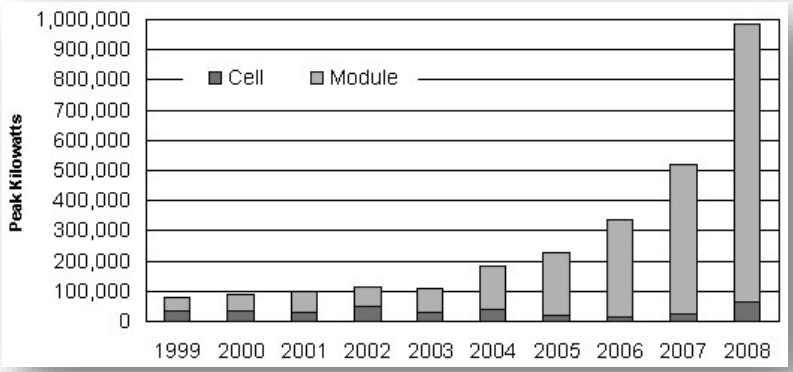


FIGURE 1

PV manufacturers that participated in SEIA's surveys in 2008 reported a 60% increase over production from 2007, as shown in Figure 1. Photovoltaic capacity, a measure that describes the world's overall ability to produce solar energy grew by 58%, and solar water heating capacity increased by 40% (SEIA, 2008). The SEIA also reports knowledge of several projects in an early development stage with a combined 6,000 MW output—enough to potentially power 6 million residential customer homes. These projects can be observed in Figure 2.

6,000 MW of CSP Projects Queued Up

Developer	Project Name	Electricity Purchaser	Location	Technology	Capacity (MW)
Abengoa Solar	Solana plant	Arizona Public Service	Gila Bend, AZ	Trough	280
Ausra		Pacific Gas & Electric	Carrizo Plain, CA	Linear Fresnel	177
BrightSource Energy	Ivanpah	Pacific Gas & Electric	Barstow, CA	Tower	300
BrightSource Energy	Ivanpah	Southern California Edison	Barstow, CA	Tower	100
BrightSource Energy		Southern California Edison	California	Tower	1,200
Emcore/SunPeak Power			Southwest US	Lens CPV	200
eSolar	Gaskell Sun Tower (Phase I)	Southern California Edison	Kern County, CA	Tower	105
eSolar	Gaskell Sun Tower (Phase II)	Southern California Edison	Kern County, CA	Tower	140
Florida Power & Light Co.	Martin Next Generation Solar Energy Center	Florida Power & Light Co.	Martin County, FL	Trough	75
GreenVolts, Inc.		Pacific Gas & Electric	Byron, CA	CPV	2
Harper Lake, LLC	Harper Lake Solar Plant		California	Trough	250
Inland Energy, Inc.	Palmdale Hybrid Gas-Solar plant		Palmdale, CA	Trough	50
Inland Energy, Inc.	Victorville Hybrid Gas-Solar plant		Victorville, CA	Trough	50
NextEra Energy Resources	Beacon Solar Energy Project		Kern County, CA	Trough	250
San Joaquin Solar, LLC	San Joaquin Solar 1	Pacific Gas & Electric	Coalinga, CA	Trough	53
San Joaquin Solar, LLC	San Joaquin Solar 2	Pacific Gas & Electric	Coalinga, CA	Trough	53
Solar Millennium	Nye County Project 1	NV Energy	Nye County, NV	Trough	250
Solar Millennium	Nye County Project 2	NV Energy	Nye County, NV	Trough	250
Solel	Mojave Solar Park	Pacific Gas & Electric	Mojave Desert, CA	Trough	553
Sopogy	Demonstration plant		Kailua-Kona, HI	MicroCSP	1
Stirling Energy Systems	SES Solar One	Southern California Edison	Victorville, CA	Dish-engine	500
Stirling Energy Systems	SES Solar One Expansion	Southern California Edison	Victorville, CA	Dish-engine	350
Stirling Energy Systems	SES Solar Two	San Diego Gas & Electric	Imperial County, CA	Dish-engine	300
Stirling Energy Systems	SES Solar Two Expansion	San Diego Gas & Electric	Imperial County, CA	Dish-engine	600
				Total Projects Under Development	***6,090***

www.seia.org

FIGURE 2

One notable example of these is Solana, a project designed to be the world's largest solar energy farm just outside Gila Bend, Arizona. These long-term investment projects provide some stability and encouragement to financiers who are contemplating moving into future renewable energy investments.

With healthy competition in the technology marketplace, firms like First Solar are continually developing new ways to increase output at a lower cost to consumers. As the benefits of early adaptation is realized by few, many should begin to follow suit in the years to come--with some experts predicting that 2010 and beyond will be record years for development in solar technology.

BRIEF HISTORY OF THE TECHNOLOGY

The human race has harnessed the power of the sun since the seventh century B.C., when a magnifying glass was used to concentrate the Sun's rays to create fire (*Department of Energy, 2006*). As civilization progressed, so did the use of the technology. Between the third century B.C. and 20 A.D., mirrors and reflective shields were used to light torches for religious ceremonies and even as weaponry to set fire to approaching enemy ships.

By the nineteenth century, French scientist Edmond Becquerel discovered the Photovoltaic Effect, which became the basis for modern solar technology. In the following years, scientists experimented with different elements and compounds, such as Selenium, Cadmium Sulfide, and the combination of Copper and Cuprous Oxide (*Department of Energy, 2006*).

In 1954, the modern era of solar technology was born when Daryl Chapin, Calvin Fuller and Gerald Pearson developed the first Silicon Photovoltaic Cell at Bell Telephone Laboratories (Department of Energy, 2006). Throughout the 1960's, 70's and 80's, improvements in efficiencies were made, as shown in Figure 3. Cell efficiency is a metric by which solar cells are measured, and refers to the ability of a cell to convert captured sunlight into electricity. The most ubiquitous types of cells used are Silicon-based and thin-film. Since 1975, there has only been an average gain of 7.5 percent in Silicon-based PV cell efficiency. Thin-film PV cells have gained an average of 19.5 percent during that same period. Other more obscure types of cells, such as multi junction and single junction concentrators have up to a 13.1% efficiency advantage over the nearest Silicon-based competitor, or a 20.8% efficiency advantage over the nearest thin-film competitor.

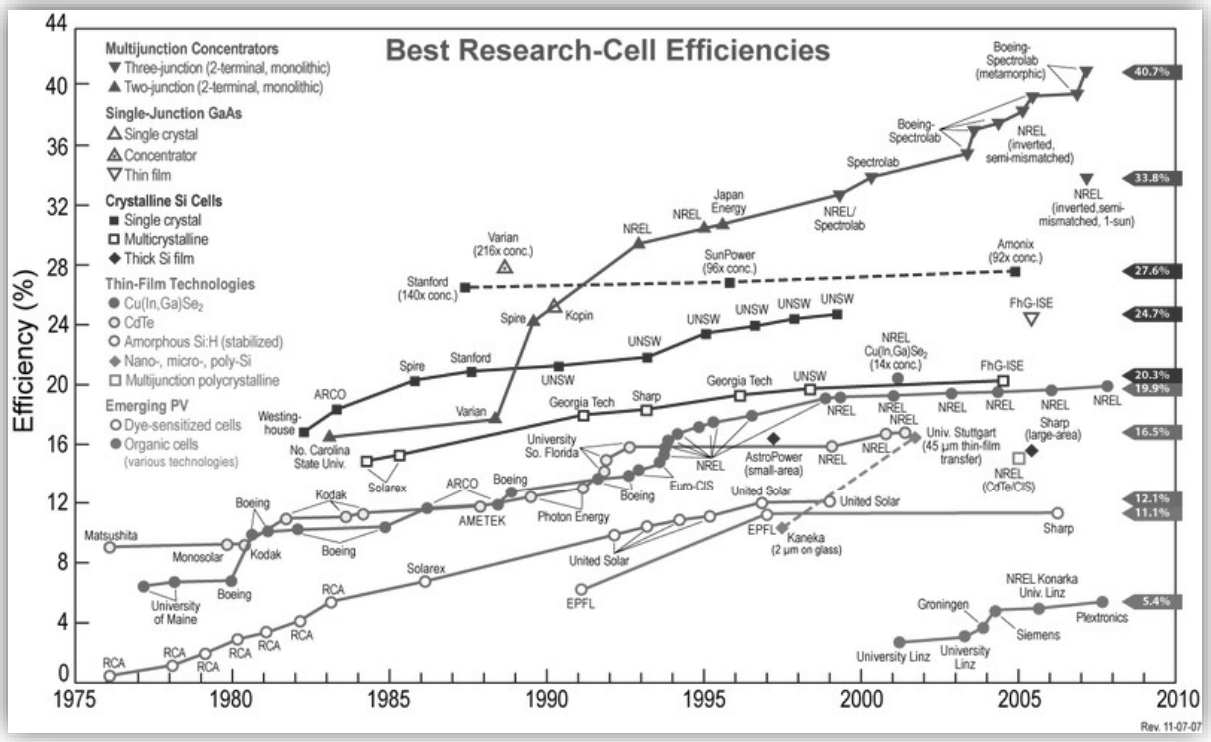


FIGURE 3 (LAWRENCE KAZMERSKI, DON GWINNER, AL HICKS, 11/11/07)

THE PHOTOVOLTAIC EFFECT

The Solar Industry is built upon the photovoltaic effect, discovered in 1830 by Edmond Becquerel (*Susman 2008, p 2489*). Sunlight is comprised of photons, or packets of solar energy. When these photons strike a Photovoltaic Cell, three possibilities may occur. They can either be reflected, absorbed, or pass through the cell. The photons that are absorbed generate electricity by means of transferring to an electron in at atom of the semiconductor (creating the "hole" referenced in Figure 2). At that point, it then becomes part of the current in an electrical circuit *("The Photovoltaic Effect," 2009*).

Photovoltaic solar cells are comprised of two layers of semiconducting material. The boundary or "junction" between the layers acts as a diode, which is a type of terminal device known for its unidirectional electrical current property (*Susman 2008, p 2490*). The layers are generally comprised of silicon (or like material) combined with boron (p-type) and phosphorus (n-type). The Photovoltaic Cells are encased in modules that are configured into arrays typically found on rooftops or the ground (*Susman 2008, p 2491*).

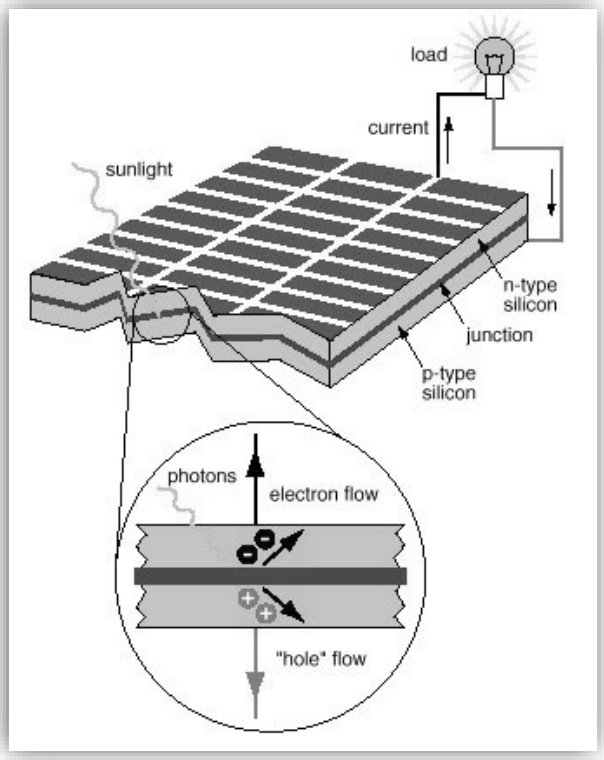


FIGURE 4
(PETERVALDIVIA, 2009)

MANUFACTURING PROCESS AND SUPPLY CHAIN

From a high-level perspective, the photovoltaic cell manufacturing process is comprised of six parts that span from raw material to end user, as shown in Figure 5. At the beginning of the process, the first component is *Raw Material Refining*. This component refines and processes the raw inputs needed to manufacture photovoltaic cells, and may range from Silicon to Cadmium Telluride (which is a crystalline compound formed by Cadmium and Tellurium). Other ancillary materials needed in production are also included in this area, such as organic polymers (plastics) and nanotubes (function as thermal conductors).

The next component is *Ingot Production*. An ingot is a cast of a particular material, manufactured with the intent of further refining and processing. For example, raw Silicon and other materials are combined or refined, and then cast into larger blocks for further processing.

Once the ingots are produced, individual wafers are cut and sliced from the ingots, to later be used in photovoltaic cell processing and construction. This is known as *Wafer Production*.

The fourth component of the manufacturing process is *Module Assembly*. After the photovoltaic cells are assembled, they are connected and placed into modules, which are more colloquially known as "solar panels."

The modules are then connected and arranged to the specifications of the order, and become a system. Therefore, *System Assembly* is the fifth component of the manufacturing process.

System Installation is the final component, in which the end user assumes control or ownership of the finished product.

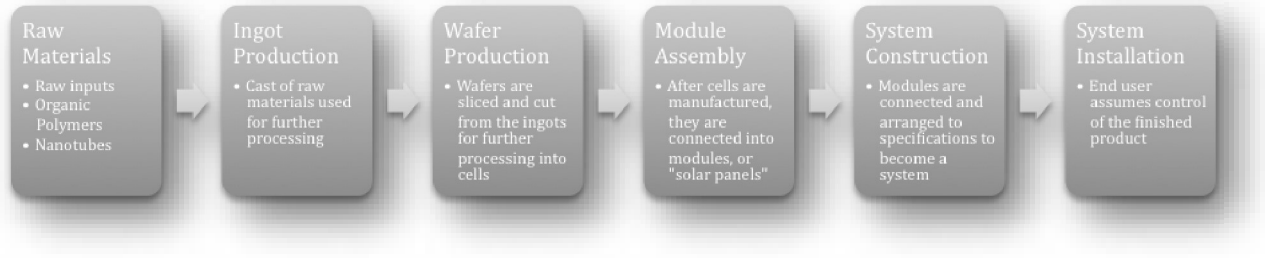


FIGURE 5

In regards to the supply chain, there is a similar six-component structure, as shown in Figure 6. The first component of the supply chain is known as *Raw Materials and Machinery Suppliers*. There are relatively few suppliers of the raw materials, which may give suppliers an advantage, and further the commoditization of solar energy inputs. For example, seven companies supply a majority of Silicon used in photovoltaic cell manufacturing. They are Hemlock Semiconductor, Wacker, Renewable Energy Corp, MEMC Electronic Materials, Tokuyama, Mitsubishi and Sumitomo (Hodge). Conversely, at the other end of the supply chain, there are many providers of installation services.

The next component of the PV cell supply chain is *Design and Development Services*. Generally, this is comprised of university researchers, firms focusing on research & development, or engineering firms. Dependent upon the level of integration for a given PV cell manufacturing company, this may be done in-house, through partnerships and alliances, or outsourced.

The third component of the supply chain is comprised of *Component Suppliers*. Suppliers in this area of the supply chain are responsible for assembly of the PV cells and distribution of other associated parts, such as thermal collectors or mounting structures. Although some firms may be vertically integrated enough to manufacture their PV cells, some companies pursue a strategy that utilizes outside component suppliers to furnish them with products.

Next, *Product Manufacturers/Integrators* are responsible for bundling or integrating solar packages and OEM system manufacturing.

The fifth component of the supply chain is *Construction and Installation Services*, which are generally comprised of installation companies, construction or maintenance-related companies, and engineering firms. Dependent upon the application, these roles may overlap as some providers have more than one function.

Lastly, Solar *Power Developers* are responsible for development related activities, such as feasibility studies, project development and utility companies.

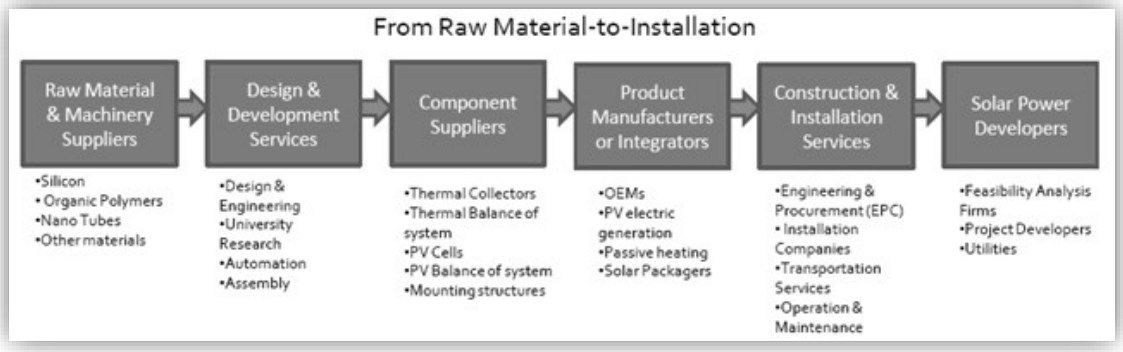


FIGURE 6
(BIEKSHA, 2009)

The recent push for solar technology has caused a change in supply chain structure and competitive strategy. Until the economic downturn of 2008, there was demand for photovoltaic cells that could not be satisfied by supply. This caused an influx of new entrants to the market and heavy capital investment in production facility construction and expansion (*Bierksha, 2009*). This overcompensation caused an imbalance that reversed the previous economic situation, creating excess supply. In other words, the macroeconomic environmental downturn caused the condition of excess capacity, which means that a firm is producing below their capability or optimal level for maximized profitability. Historically, when conditions such as these occur, a period of decreased prices and increased industry consolidation follows. The larger companies are able to acquire smaller competitors, therefore growing in capacity and at times vertically integrating.

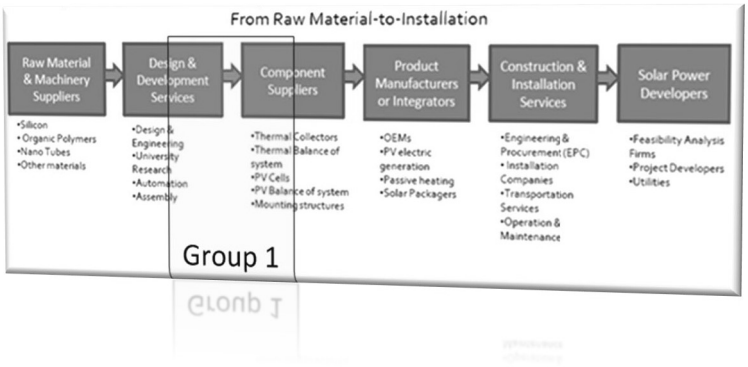
Due to the change experienced in the industry, two strategies became prevalent: vertical integration, and outsourcing to contract manufacturers (*Bierksha, 2009*). Vertical integration is appealing due to increased margins from owning upstream suppliers and downstream buyers, lower production costs, and increased quality control. Outsourcing is also appealing due to the amount of capital that is left unrestricted, able to be spent on research and development rather than being invested into building manufacturing plants.

INDUSTRY COMPOSITION

There are fifteen companies that comprise the majority of the solar energy industry, approximately 65% in 2007 (*Susman 2008, p 2496*). These firms may be further consolidated into four strategic groups of companies that make similar choices in regards to vertical integration and which markets to enter.

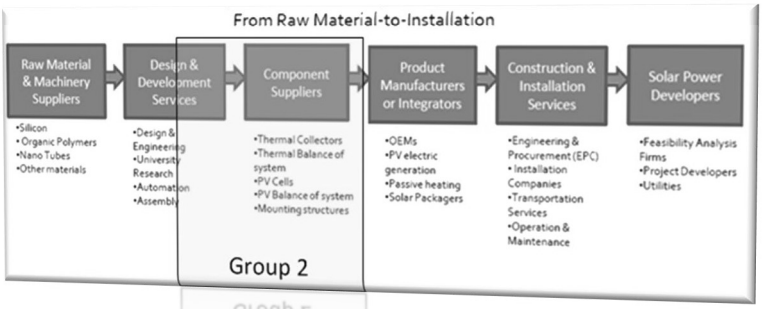
GROUP 1: The three companies that make up this group are the least integrated. They only make cells, or produce cells for OEM companies that integrate them into modules and sell them to end-users.

JA Solar
Motech
Q-Cells



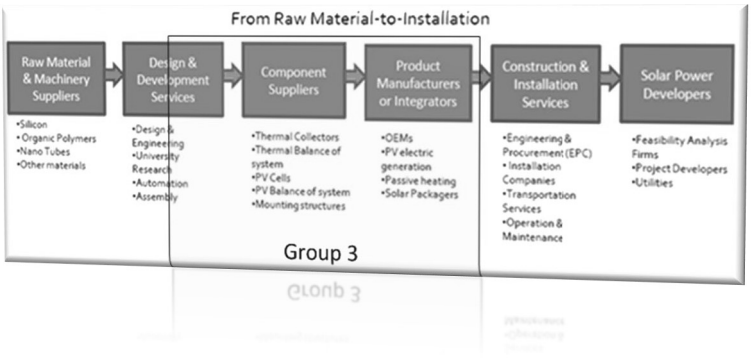
GROUP 2: These companies are integrated only to the module level. They rely on independent distributors and installers, and have a commercial and utility-centered focus.

Isofoton
Mitsubishi
Sanyo



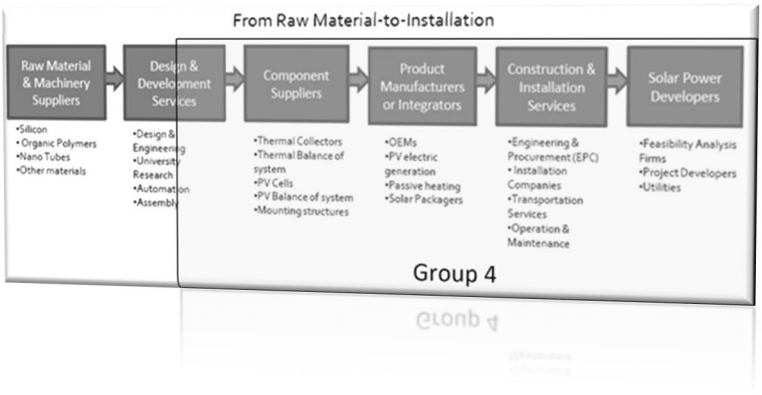
GROUP 3: Companies comprising the third group are integrated to the systems level, produce some of their own components, have an authorized dealer network, and maintain a residential focus.

Kyocera
Sharp
SolarWorld
BP Solar



GROUP 4: This strategic group is the most integrated, and focuses on large-scale power plant and utilities projects.

SunPower
First Solar



The three remaining companies are shown in Figure 7, which offers a visual representation of the top fifteen companies and their respective strategic positions.

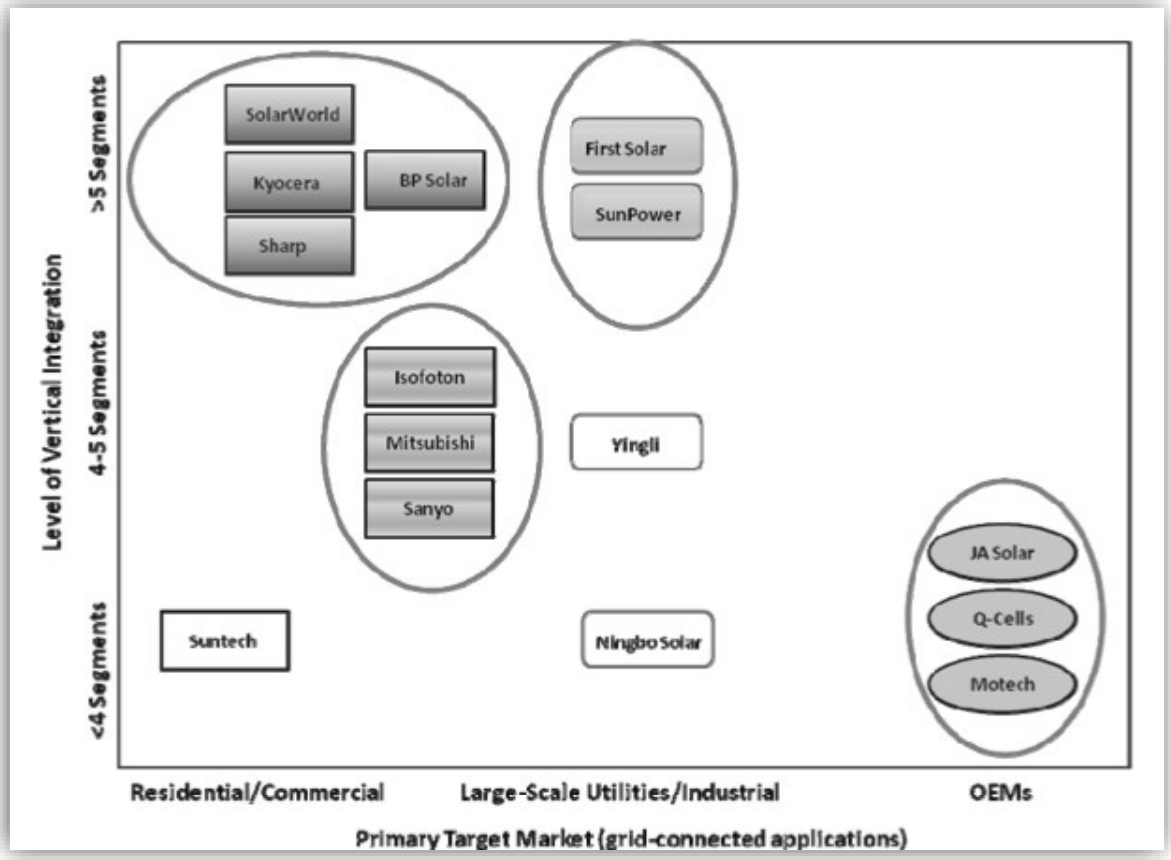


FIGURE 7
(SUSMAN, 2008)

PORTER'S FIVE FORCE ANALYSIS

In this section we will focus on large scale, highly integrated solar providers using the Porter's five forces model for competitive analysis (Group 4). We are focusing on these companies because they control the majority of their supply chain. They are the major players in driving the advancement of solar power and have the most control over the industry. These companies acquire raw materials, specifically silicon, in order to produce PV cells, create solar modules by combining multiple PV cells together, and finally create full scale systems.

SUPPLIERS

In the highly integrated, large scale solar segment, raw materials (Silicon, Cadmium, and Tellurium) are the most important items of PV cell creation.

SILICON

Silicon is the second most naturally occurring element on earth following Oxygen according to the article "*Evolution of the Solar Energy Industry: Strategic Groups and Industry Structure*" (Susman, 2008). However, there are seven major providers who control the supply of Silicon in the world. The limited number of providers is due to the sophisticated process of mining and refining Silicon to the quality required for PV cell manufacturing. The limited number of suppliers and high demand means that these suppliers wield a lot of power over companies that manufacture PV cells. The demand for silicon comes from many other industries. For example, silicon can be used for many things such as, computer components, circuit boards, medical purposes, and cement. It is important to note that suppliers of silicon could lose some power because the increasing price of silicon has enticed new entrants into the mining and processing of solar grade silicon

World Production, Reserves, and Reserve Base:

	Production[e, 4]		Reserves and reserve base[5]
	2006	2007	
United States	[r]146	156	The reserves and reserve base in most major producing countries are ample in relation to demand. Quantitative estimates are not available.
Brazil	226	230	
Canada	66	66	
China	2,900	2,900	
France	124	170	
Iceland	74	75	
India	38	38	
Kazakhstan	68	68	
Norway	150	160	
Russia	541	540	
South Africa	144	140	
Spain	55	55	
Ukraine	84	120	
Venezuela	60	60	
Other countries	297	300	
World total (rounded)	4,970	5,100	

Ferrosilicon accounts for about four-fifths of world silicon production (gross-weight basis). The leading countries for ferrosilicon production, in descending order of production, were China, Russia, Ukraine, the United States, and Brazil, and for silicon metal, China, Brazil, and Norway. China was by far the leading producer of both ferrosilicon and silicon metal. An estimated 570,000 tons of silicon metal is included in China's production of silicon materials for 2007.

FIGURE 8

(HTTP://MINERALS.USGS.GOV/MINERALS/PUBS/COMMODITY/SILICON/MCS-2008-SIMET.PDF)

CADMIUM

Since 1969, production and consumption of Cadmium has declined because of the migration of primary zinc production from the United States to other countries. Production has also declined due to environmental concerns about the toxicity of certain forms of cadmium. During the second half of the 20th century, cadmium use came to be dominated by the application in NiCd electrical batteries. By 2000, about three-fourths of the cadmium consumed went into batteries, and the remaining one-fourth was used for pigments, coatings and plating's, stabilizers for plastics, and miscellaneous small-volume uses (Plachy, 2001). Figure 9 shows the steady decline of Cadmium refining and consumption since the 1950's.

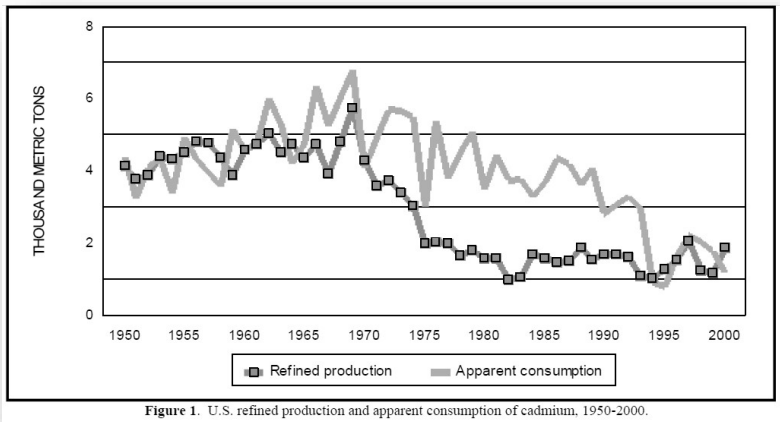


Figure 1. U.S. refined production and apparent consumption of cadmium, 1950-2000.

FIGURE 9

(HTTP://PUBS.USGS.GOV/OF/2002/OF02-238/OF02-238.PDF)

TELLURIUM

Tellurium (Te) is an element not currently used for many applications. Only a small amount, estimated to be about 800 metric tons per year, is available. According to USGS, global tellurium production in 2007 was 135 metric tons. Most of it comes as a by-product of copper, with smaller by-product amounts from lead and gold. One gigawatt (GW) of CdTe PV modules would require about 93 metric tons (at current efficiencies and thicknesses), so this seems like a limiting factor. However, because tellurium has had so few uses, it has not been the focus of geologic exploration. In the last decade, new supplies of tellurium-rich ores have been located. Figure 10 shows the increase in production of Tellurium since 2001. Recently, researchers have identified tellurium as the most abundant element in the universe. Researchers have shown that well-known undersea ridges are rich in Tellurium and by themselves could supply more than could ever be used to meet global energy demands. However, getting to the sources of undersea Tellurium would be difficult *(Wikipedia, Cadmium telluride photovoltaics, n.d.).*

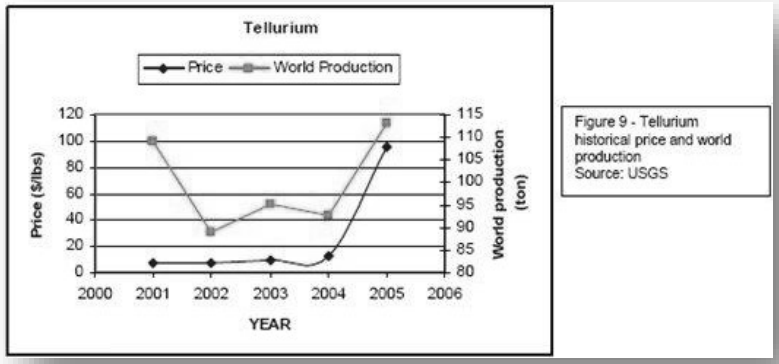


FIGURE 10

(HTTP://WWW.RESOURCEINVESTOR.COM/NEWS/2008/3/PAGES/MATERIALS-FOR-SOLAR-PHOTOVOLTAIC-CELLS-II-.ASPX)

BUYERS

There are very few customers that make up a large portion of the sales for PV systems in this segment of the industry. These customers have a lot of power over their suppliers. These customers exhibit strong negotiating leverage because each customer purchases in volumes that are large relative to a single vendor (Porter HBR 2007; 5 Competitive forces that shape strategy). For example, SunPower has two customers that account for 50% of sales, and First Solar has six customers that account for 90% of sales. In addition, if customers believe they can find an equivalent product they tend to play one vendor against another (Porter HBR 2007; 5 Competitive forces that shape strategy). This would occur if a customer decided to purchase based solely on price, soliciting multiple bids from the suppliers to obtain a lower cost.

NEW ENTRANTS

New entrants will have a difficult time entering the market because of economies of scale. Larger scale economies and patents help increase the barrier to entry. Larger scale economies allow current PV cell manufacturers to create agreements with silicon suppliers to reserve more of the raw materials needed for making the PV cells. New entrants would need to acquire a large market base in order to compete with current companies. The larger PV cell manufacturers are able to acquire or create an alliance with other companies along the supply chain giving them greater access to distribution channels. These partnerships allow for greater market and capacity expansion, increasing the barrier to entry.

Factors that decrease the barriers to entry are common technology, there is little brand franchising, and government subsidies such as tax credits allow for new entrants to make a move on the market. There are also improvements that can be made to PV cells. Currently, the most efficient PV cells can only convert 20% of sunlight, and the size of the solar panel systems requires a significant amount of square footage. A manufacturer that could make a more efficient PV cell or a smaller PV cell could easily enter the market. The process of creating PV cells can also be improved by reducing the number of steps in the manufacturing process. New entrants could gain a competitive advantage and gain market share if they were able to improve the PV cell manufacturing process.

If a new entrant could make improvements in size, efficiency, creation, or price they could easily gain a huge advantage and in turn become the leader in PV cell manufacturing and the sale of entire PV systems.

SUBSTITUTES

Solar power is one of the most expensive and least efficient ways of creating energy; however solar energy is the most renewable and prevalent source of energy available around the world. Several substitutes are thermal solar, wind, geothermal, coal (fossil fuels), methane (alternative gas), tidal, bio-fuels, and nuclear. The major portion of energy is currently produced from coal and crude oil. Crude oil is readily available and inexpensive, but because of the reliance on limited sources of crude oil and the fact that it creates a large amount of greenhouse gases, countries are trying to find alternate ways of producing energy. However, crude oil can be bought at a fraction of the cost of solar energy and the energy conversion efficiency from crude oil is much higher than that of solar power.

RIVALRY

There are a relatively small number of competitors in the Group 4 segment. All of the companies offer equally attractive products and services at a similar cost. Therefore, if one company is able to decrease their expenses, they would have an immediate advantage over the competition. One way these companies are able to decrease costs is by bargaining with suppliers of raw materials to buy in bulk.

In strategic group segments 1, 2, and 3, no one company holds the absolute majority of the market share. The top 15 companies make up 65% of the market share in general. In order to compete and maintain a competitive advantage the companies in these segments must spend a significant amount of money on research and development. Typically, research is done to improve the manufacturing process, by reducing waste, decreasing operating costs and material costs, or improving the efficiency of the PV cell.

COMPANY ANALYSIS

COMPANY CHOICE

For the purpose of this project, our group has chosen to look at First Solar, Incorporated. First Solar represents the apex of companies who operate in Strategic Group 4.

PHYSICAL PROXIMITY

First Solar is located geographically adjacent to a major metropolitan area who is a leader in sustainable and green initiatives. Not only has the city of Phoenix built the country's first Leadership in Energy and Environmental Design, or LEED accredited convention center, but is home to Arizona State University—one of the first universities in the nation to have a Sustainability College. First Solar's choice to position themselves in a market dedicated to sustainable technology opens them to several potential partnerships and new developments and technologies not available to competitors who operate in the same market.

UNIQUE BUSINESS STRATEGY

First Solar has a very unique business strategy that allows them to create fully integrated complete modules in less than 2.5 hours (First Solar, Inc. Fast Facts, 2009). First Solar's business success is proven not only by its rapid growth, but by investor confidence. First Solar has been able to outperform several market indicators including the SP 500 by 104%. First Solar has been a leader in technology, through use of such practices as 'Copy Smart' technology, allowing which allow them to rapidly deploy new PV cell production lines wherever necessary, and its highly integrated supply chain. This highly integrated start to end solar production supply chain was developed, implemented and honed by First Solar, and has seen immediate success. This offers a distinct learning advantage and opportunity for analysis that other Group 4 companies do not have.

MARKET CAP/SHARE

First Solar is a leader in the industry financially. By year-end 2008, First Solar had roughly $716 million in cash or cash equivalents. In addition, First Solar has a 10 billion market cap. SunPower, by comparison, has 200 million in cash and a 2.10 billion market cap. See Appendix A for financial highlights of major solar power companies. This gives First Solar a budget for growth and expansion, a luxury not afforded to many in the industry. This perspective of rapid growth, market capitalization and dominance offer an insight into the procedures and financial information from a large fortune 500 company, with the growing pains and excitement of a new startup enterprise. First Solar continues to work on cutting edge solutions for the industry—not only because of the social and economic impact, but in part due to the fact they have the financial resources to do so.

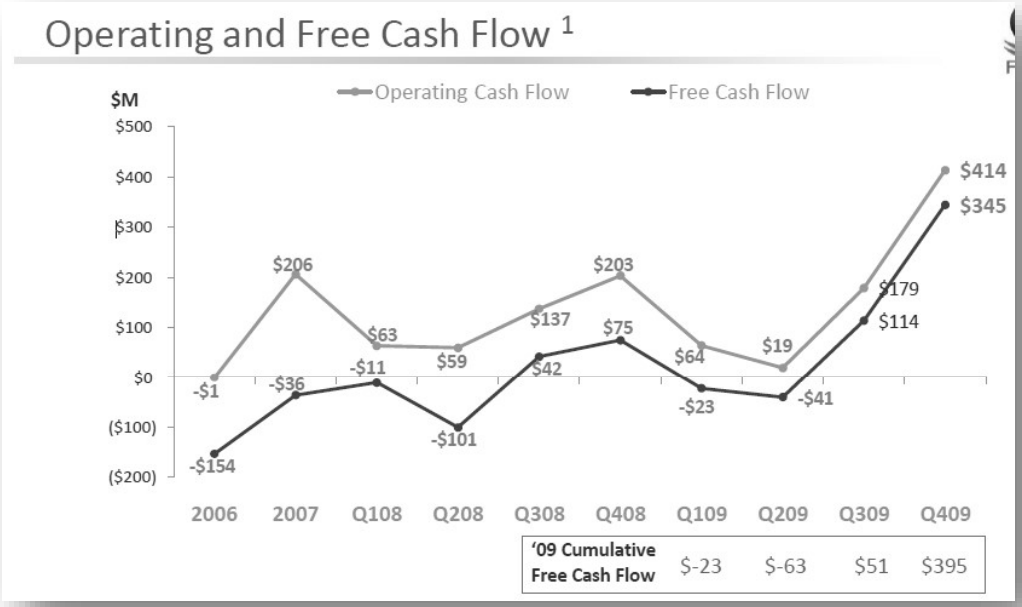


FIGURE 11

Financials

- Q4 Net Sales $641 million, and Fiscal 2009 $2,066 million up 66% Y/Y
- Net income $142 million in Q4, and $640 million for 2009
- Q4 Diluted EPS $1.65, and $7.53 in 2009 up from $4.24 in 2008
- Cash and marketable securities $1.1 B, generated $395 million free cash flow in 2009

INTERNATIONAL PARTNERSHIPS, LUCRATIVE MUNICIPAL EXPANSION

First Solar recently announced another step in the ongoing business deal with Chinese government (link) to create the world's largest solar power plant in Mongolia. This deal, based upon a Memorandum of Understanding signed in the presence of a Chairman of the National People's Congress of China, outlines the steps needed to implement a multi-year period solar installation over 9 years generating 2,000 Mw. These actions represent a significant step forward in global partnerships among companies and governments, and provide a glimpse into the relationship that will define the future of First Solar's large scale solar projects.

VISIBILITY/BRAND RECOGNITION

Currently, First Solar has limited brand recognition, with the exception of those within the industry. Ron Tovella, CEO of AllWest Energy—a local Arizona Integrator, claims that First Solar has little or no recognition amongst consumers, and that the majority of his clients "…prefer to buy American, prefer to buy Sharp."

First Solar was formed in 1999, and has grown relatively quickly to become an industry leader in PV cell production. They are headquartered in Tempe, Arizona, but have global presence in varying capacities throughout the United States, Europe and Asia. First Solar specializes in Cadmium Telluride PV cells, which is an alternative to the Silicon-based cells of other major industry players (Susman 2008, p 2490).

First Solar's mission is to create enduring value by enabling a world powered by clean, affordable solar electricity (First Solar Corp Overview 3). This is to be accomplished by means of the company's strategy, which is an equation shown in Figure 6.

FIGURE 12

There are multiple strategic methods of achieving enduring business value. The methods include the reduction of solar energy costs to sustainable levels through technology development, operational excellence and scale, adaptive business models (using price), and partnerships to expand their markets. Another means of implementing their strategy is by owning and developing the technologies necessary to be the low-cost provider of solar electricity. Lastly, First Solar maintains financial discipline to ensure superior returns on invested capital (First Solar Corp Overview 4).

As of the third quarter of 2009, Fist Solar became the first PV cell manufacturer to produce modules at less than one dollar per watt, or eighty-five cents per watt, to be more specific (Fist Solar Corp Overview 5). Projections state that price per watt could be further reduced to between fifty-two and sixty-three cents (First Solar Corp Overview 11).

Currently, First Solar's PV cells are converting energy at a rate of eleven percent. Through research, development and process integration, studies estimate this number to reach approximately fifteen percent by 2014 (First Solar Corp Overview 14).

MARKETS SERVED

As mentioned in a previous section, the solar industry can be divided into four strategic groups. First Solar is a member of the fourth strategic group, which focuses on large-scale power plant projects, and more broadly falls into the industrial and large-scale utilities market (Susman 2008, p 2496). Due to its level of vertical integration, First Solar is able to offer customers a turnkey solution for their solar needs. In addition to manufacturing cells, First Solar has the capabilities to handle engineering, procurement and related construction needs (First Solar Corp Overview 6).

COMPETITIVE STANDING

First Solar and SunPower, which comprise Strategic Group 4, are the most vertically integrated, industrially focused of the top fifteen companies included in Susman's study of the aggregate market. When financially compared to its closest competitor, SunPower, both had similar revenue figures for fiscal year 2008. First Solar grossed approximately $1.25 Billion, while SunPower grossed approximately $1.43 Billion (SEC filings). However, First Solar's net income and overall profitability is relatively much higher than SunPower's, as shown in the appendix of financial statements, more specifically on the Consolidated Statement of Operations. In fiscal year 2008, First Solar's net profit margin was 27.9%, while SunPower's was only 6.4%. The trend continued into 2009, with First Solar boasting a 30.98% net profit margin. At the time of this writing, SunPower had not yet posted year-end financial results. To further illustrate the financial position of First Solar, Market Cap is approximately $11.03 Billion as of December 5, 2009. SunPower, on the other hand, has a Market Cap of approximately $2.16 Billion. The Market Cap, as it is colloquially known, is a measure of a company's value by multiplying stock price by the number of outstanding shares. This disparity illustrates the public's consensus on the value of the company as a whole. A third indicator of First Solar's financial health is the level if cash it retains during a fiscal year. As illustrated in the Balance Sheets within the appendix of financial statements, it is evident that First Solar is far more liquid than its nearest competitor, SunPower. At year-end 2008, First Solar had roughly $716 million in cash or cash equivalents, while SunPower had roughly $202 million for the same point in time. It is of paramount importance to remain liquid in an industry such as Solar Energy, due to the amount of research & development, and capital investment needed to operate and grow. See Appendix B for financial statements of First Solar and SunPower

FIRST SOLAR SWOT ANALYSIS

STRENGTHS

First Solar is an industry leader in thin-film photovoltaic cell manufacturing, being the first to integrate non-silicon, thin film solar module technology into high-volume, low-cost production. They were the first photovoltaic cell manufacturer to break the $1 per watt manufacturing cost barrier in the 4th quarter of 2008, and continue to maintain the lowest manufacturing cost in the industry at $0.85 per watt (3rd quarter 2009). To leverage this strength, First Solar has patented their production methods and processes, dubbed 'Copy Smart', which allow them to rapidly deploy new PV cell production lines wherever necessary. To date, First Solar has built two production facilities, in Germany and Malaysia, using this methodology, increasing their production capacity to 1,219 Megawatts in 2009.

First Solar is highly integrated vertically. With the recent purchase of Turner Renewable Energy, a PV installation project planning company, First Solar has direct control over the major components of their supply chain, with the single exception of raw material production and procurement (*Susman, 2496*). This puts them in a similar position to companies like Apple, in which the entire value chain - production process, marketing, and customer interaction and experience - is managed by one entity. First Solar's closest direct competitor, SunPower, has done the exact same thing by purchasing the project planning firm Powerlight. In contrast to other smaller PV manufacturers, First Solar presents a unified message and consistent product quality and support for the entire system rather than a single portion of it.

Financially, First Solar is in an enviable position coming out of the current economic downturn. As of 12/4/09, First Solar had $523.65M cash on hand. Strong financial position has allowed First Solar to invest money in research and development when many other companies in the industry are focused on keeping the lights on. So far, First Solar has invested $54.5M in R&D in fiscal 2009.

WEAKNESSES

With a focus on large PV system installations, First Solar significantly limits the potential customers that it is able to market to. In 2008, approximately 90% of their income was a result of contracts with 14 customers. The municipalities and utility companies that make up this customer base are far from numerous, and are largely subsidized by government programs. If these government programs were discontinued, demand for First Solar's product in their chosen market could dry up, as buyer power would be significantly reduced.

According to a study conducted by iSuppli Corp, First Solar held a 7% market share of the total industry in 2008, while SunPower maintained a market share of 4% *(see Figure 10).* This leaves 91% of the global industry untouched by the group in which First Solar operates. This remainder is comprised mostly of small/medium business and residential installation projects, in which First Solar does not currently compete.

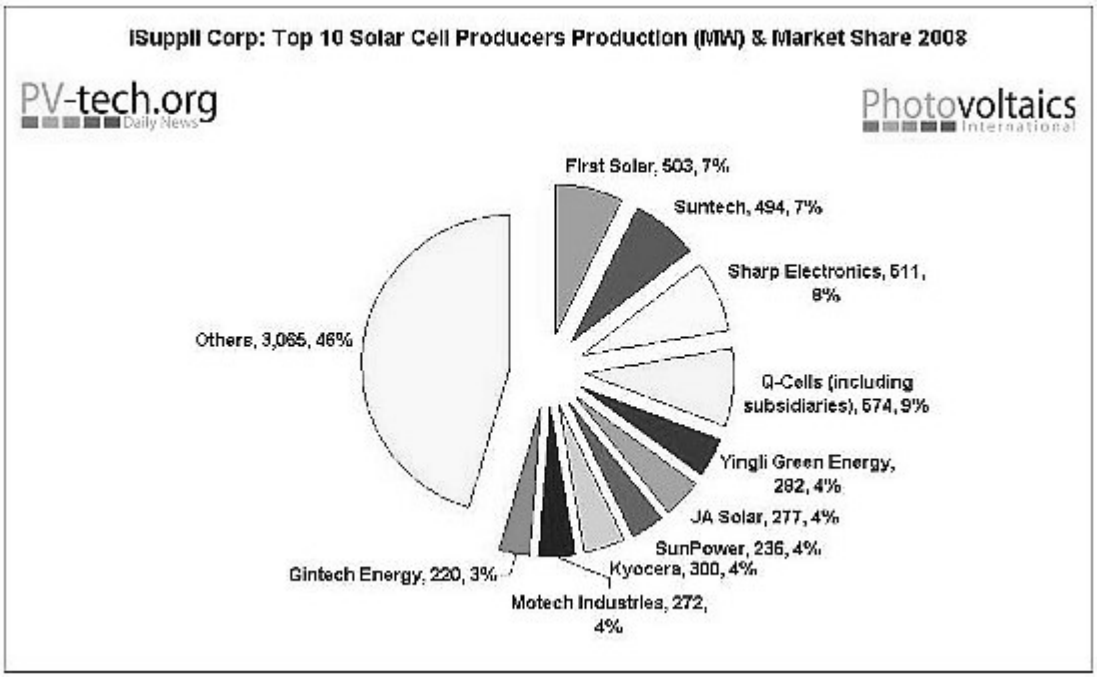


FIGURE 13
WWW.PV-TECH.ORG

PV module manufacturing requires certain rare resources that are in ever shortening supply. First Solar's thin film Cadmium Telluride (CdTe) cells require the element Tellurium. The rarity of Tellurium (1-5 parts per billion in the Earth's crust) could pose a problem in the future as First Solar's production capacity grows and demand for their product increases(*Wikipedia: Cadmium Telluride, n.d.*). According to the United States Geological Survey, 135 metric tons of Tellurium was produced in 2007 (*USGS, Tellurium, 2008*). Including available reserves, approximately 800 metric tons of tellurium is available per year. Taking into account that it takes 93 metric tons of tellurium to produce 1 GW of CdTe PV modules (*Wikipedia: Cadmium Telluride Photovoltaics, n.d.*), the limiting factor of supply becomes readily apparent. As it stands today, First Solar's 1,219 MW of production capacity would require approximately 113 metric tons of Tellurium, 14% of what has been available each year (including reserves), and 84% of what was mined in 2007. A lack of product diversity could hurt First Solar in the long term. In addition, due to the lower cost of production (at current raw material price levels), the production costs for thin film PV cells versus silicon have enticed a number of upstart companies to jump in to the industry. This has increased the demand for rare resources, specifically Tellurium, adding to the potential problem.

OPPORTUNITIES

The PV manufacturing industry is in a strong position primarily due to the current global political climate. There is a huge emphasis placed on national energy independence. In many cases, this has led to government subsidies that help offset the cost of purchasing and installing a solar array. In Germany, homes and businesses earn 47 euro cents per KWh of solar power, nearly twice the market rate. These subsidies have been in place for nearly nine years, and have made Germany the largest market for PV solar cells in the world. Other governments, including the United States, are deliberating subsidies in their nations to help offset the initial front-end cost of solar array installation.

First Solar could potentially include home automation systems and commercial energy facility management systems. These systems would use First Solar's proprietary thin film technology combined with emerging home automation systems to create a fully integrated energy system for First Solar's clients. Home automation systems have been around for quite some time now but it is always exciting to ponder where this industry is headed for. The North American home automation market witnessed healthy growth rates during 2003 and 2004…This growth continued into 2005 with the total market estimated to be over $1.0 billion and experiencing a growth of almost 8.5 percent over the previous year (Srivatsan, 2006). First Solar has the ability through its integrated supply chain to offer solar products to the consumer market through SMB retail partners. These partnerships would help First Solar's brand recognition, as well as its ability to increase direct and indirect sales channel.

First Solar, Inc. would benefit from a potential expansion of its energy offerings though partnerships with wind energy companies, etc. These could strategically align First Solar when offering energy solutions to large municipal projects.

THREATS

With the global economy in virtual free-fall over the past several months, the solar industry has been exposed. Just as government subsidies are one of the industry's greatest strengths, they are also its Achilles heel. Germany has begun to scale back their existing subsidy program, and many other nations are rethinking their stance on funding the installation of solar arrays. In addition, the cost of fossil fuels has decreased significantly from their highs a year ago, making the playing field even rockier for solar.

First Solar produces thin-cell PV modules which uses cadmium telluride. This material is far less abundant compared to silicon and is also gaining popularity due to the increase in demand of silicon from other markets and the low price of tellurium compared to silicon. This increase in demand for cadmium telluride is creating competition for this resource which is diminishing First Solar's low-cost advantage. The increase in demand for tellurium will create a problem for First Solar. In order to stay competitive and offer lower priced solar solutions, the price of their raw materials must remain low. If the price increases to that of silicon levels it is going to be hard to maintain a low-cost competitive advantage, especially since cadmium telluride is only 10% efficient at creating electricity compared to silicon which is currently at 16% efficiency. The loss of a price advantage over silicon competitors could swing the balance in their favor.

Other alternative energy resources, such as solar thermal, silicon PV, and geothermal have the potential to affect First Solar's bottom line. If any of these alternative energy resources see improvements in efficiency, availability, and cost of installation, First Solar could face a valid potential threat financially. First Solar would no longer be the "go-to" company to provide large municipal projects that need a cost-effective solution. Recently, a new entrant entered the solar market…Google. According to a 2009 article published by Reuters, Google invested 50 million dollars into solar thermal technology, with the goal of creating a solar product that could produce energy at the same cost as coal (Gupta, 2009). This would equate to a 60% decrease in the cost of producing solar energy. Google plans on showcasing this new technology within the next few months, at which time the solar industry could be turned on its head.

POTENTIAL FOR TRANSFORMATION

Our team identified several areas that First Solar can implement technology as a driver for change within the organization. All of the following would help First Solar create a sustainable competitive advantage. These areas for potential transformation are listed in detail below.

BRAND EQUITY: STANDARD IN INDUSTRY, TRAINING AND EDUCATION/CERTIFICATION

We envision a certification platform offered by First Solar (similar to Cisco's certification system) that would provide the proper training to installation technicians, giving vendors a strategic advantage in their market. Technicians that were certified would be afforded discounts on First Solar products (much like Cisco does for its CCIE holders), providing an incentive to get certified and use First Solar's products in installations. This would allow First Solar to move into these markets, diversifying its business and increasing its long-term viability

BECOME A BPO

Currently First Solar is able to create and replicate production, facilities, contracts, and other basic functions using "Copy Smart". By creating a program to sell or outsource "Copy Smart" processes to companies looking to manufacture PV cell modules, they could essentially become a solar factory franchisor.

IMPROVE PROCESSES: STREAMLINE SHIPPING PROCESS, QUALITY, SIGMA/LEAN

First Solar has a highly successful production model. However, there may be a potential to decrease defects using Six Sigma, or increase efficiency using a lean framework.

PRODUCT DIFFERENTIATION

Currently First Solar has a single product (CdTe Solar Cells). This leaves them vulnerable to changes in the market due to rare resources. Product Differentiation would move into supplemental product lines using technologies like geo thermal or solar thermal. This would allow them to diversify and protect themselves from the potential impact's single product companies face.

PARTNERSHIPS

First Solar could form partnerships with raw material suppliers. They could also partner with solar module installers. If First Solar could partner with their suppliers they could have a price advantage on Silicon, Cadmium and Tellurium. If First Solar could lock in their prices on raw materials, and if these raw commodities were to see an increase in overall demand, other companies looking to enter the thin film Market would have a difficult time competing against First Solar simply on the basis of price.

NEW MARKETS: MOVING INTO RESIDENTIAL AND SMALL BUSINESS MARKETS

First Solar has a small number of large customers currently. First Solar could move into small business and residential markets to increase its customer base and help mitigate the potential loss of one of their current clients. Diversifying their customer base helps manage threats and also helps to increase brand recognition.

SERVICE

First Solar could create a competitive advantage by improving service to their clients. Services such as proactive maintenance and repairs, fast response times to replace dead panels, and immediate correction of inefficiencies in the system could all improve the customer experience. These services could also be available to non-First Solar clients in order to potentially obtain customers from other Solar panel providers or installers.

ONLINE PRESENCE

First Solar could use an e-commerce site to build a stronger web-base and better supply information to potential clients. It may be difficult to supply quotes since every customer is different, but First Solar could create a web-form which the customer can fill out, and a representative could get back to the customer. This representative could provide further information and assistance for the customer throughout the buying process, creating a value add for new and existing customers.

FUNCTIONAL TRANSFORMATION PLAN

EVOLUTION OF AN IDEA

In analyzing the opportunities discussed previously, our team came to the realization that many of these ideas could work together to create a product that would have a significant transformative effect on First Solar. Planning and information services, movement into the residential market, and partnerships with system integrators could be rolled into a single, online service that could move First Solar into the residential solar market and establish it as "the" source for solar information in the United States.

As discussed in phases one and two of this project, First Solar is a highly leveraged organization with regards to its customer portfolio. Our team identified this aspect of the organization as the prime candidate for business transformation, diversifying First Solar's revenue stream and protecting it against failure due to major customer loss.

When you search for solar energy on the internet, no definitive resource is presented that provides all the information (general information, government subsidies, installers, financial assistance, etc.) necessary to determine whether solar energy is right for you, and then facilitate the execution of that decision. One example is the US Department of Energy's website, but the information isn't presented in a very agreeable format, and the site does not facilitate the execution of a project. Other sites do exist to serve targeted niches. For example, the website 1bog.org is a cooperative program that unites consumers in specific markets in an attempt to drive the price of solar installations down through increased volume.

We initially sought to leverage First Solar's position as a leading manufacturer of solar systems to provide value to residential customers who utilize the service by partnering with integrators. Our team envisions a web-based platform built, sponsored, and maintained by First Solar. This platform would present all of the technical and practical information regarding solar energy and products in an easily digestible and painless format. The website would step you through the initial planning phase of a solar project by exposing the correct products, explaining government subsidies in the customer's state, presenting financial options, and facilitating the hand-off to participating installers.

This platform, dubbed Fusion (First Solar Integrator Network), will transform First Solar's business by becoming the definitive provider of solar technology information in the residential sector. It will foster goodwill within the industry, enhancing First Solar's brand recognition and marketability. It will drive customer engagements to participating installers, which in turn will increase the demand for First Solar's products in the sectors that the site services through contracts negotiated with the installers. We believe that this platform is necessary for First Solar to make a serious move into the residential consumer market, thereby diversifying their customer portfolio and supplanting all other PV manufacturers as "the leading" provider of solar energy in the United States.

We took this idea to AllWest Energy, one of our contacts in the industry, and presented it to them. They immediately delivered a heavy blow to the core of this idea. According to AllWest, First Solar's thin film product is not well thought of in the residential market due to its lower energy conversion rating and subsequent need for more real estate to make up for this shortcoming. However, they suggested that if we were to decouple First Solar's panels from the service,

integrators would be very interested. According to AllWest, contractors waste a lot of time and resources planning projects for clients that ultimately cannot qualify for the financial assistance necessary to execute the project. Fusion would pre-qualify customers, financially, prior to engaging the contractor. It would be a boon for this industry and installers would flock to it if it were created. Furthermore, AllWest suggested that our team investigate web boxes, internet connected circuit monitors that measure and report critical information about a system, to determine if they had any use in our platform.

With this new information, our team went back to the drawing board and re-envisioned Fusion. The result, and final structure of Fusion, can be observed in Figure 11.

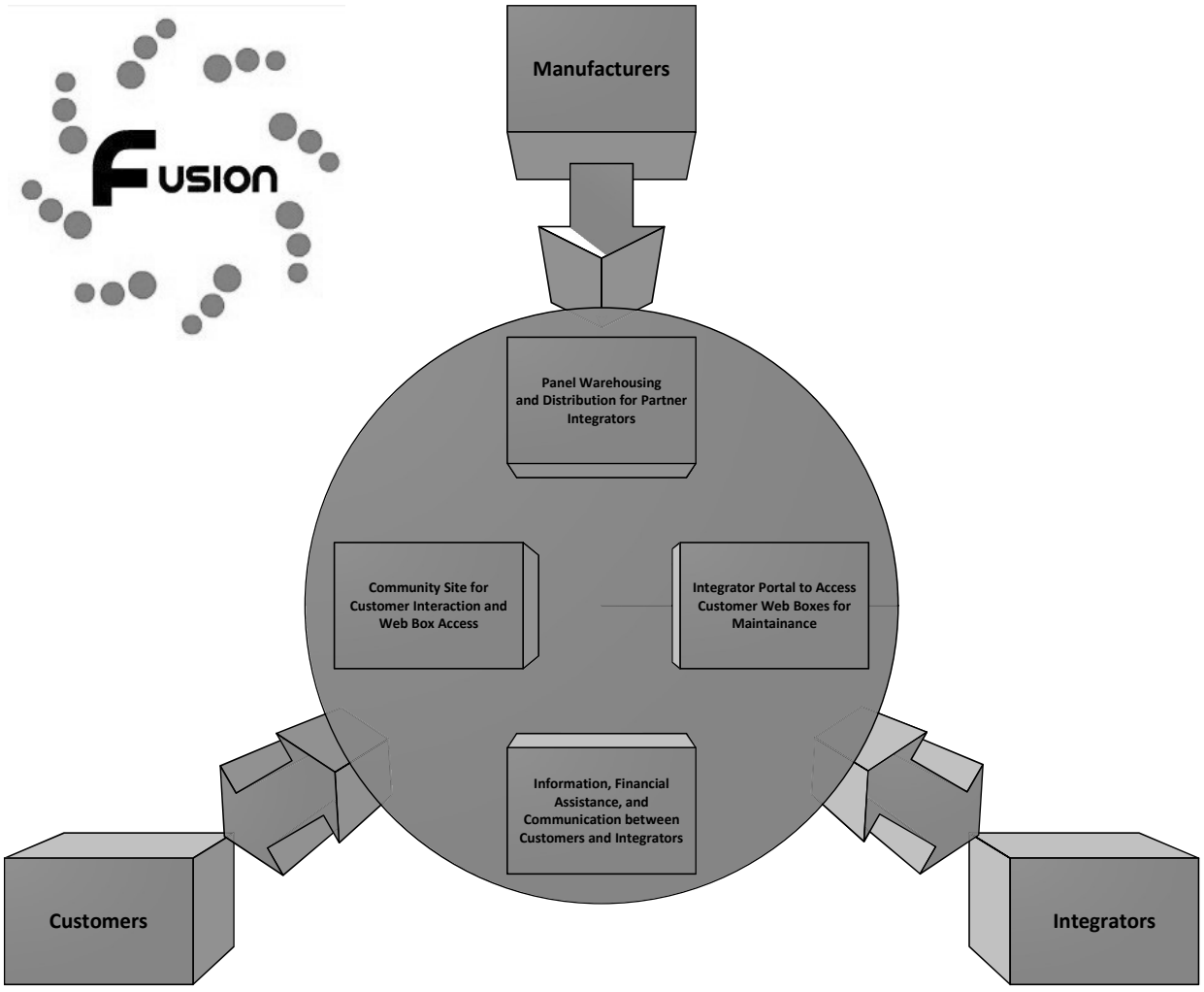


FIGURE 14: FUSION STRUCTURE

FUSION

BUSINESS MODEL AND ORGANIZATION STRUCTURE

First Solar's Fusion platform will be created as a subsidiary under First Solar. This will allow Fusion to assume a separate corporate entity without having to duplicate business units (human resources, accounting, etc.) that already exist within First Solar.

Fusion is built upon four foundational pillars that serve to add value to the overall organization.

CUSTOMER PURCHASE FACILITATION

Fusion will be populated with all of the technical and non-technical information necessary for anyone interested in solar energy to understand all of the aspects of the installation process. From the science behind solar energy conversion to methods of system installation, Fusion will present this information in an easily digestible manner. The site will be as pleasing to the eyes as it will be comprehensive.

Fusion will present all applicable government aid programs available to customers in targeted markets and facilitate the pre-qualification of customers for public and private loans to help pay for a solar installation. Fusion will do this by partnering with reputable lending institutions.

First Solar must partner with reputable lending institutions in order to provide seamless financing to their customers. Interest rates should be competitive, and loan terms should be no longer than 15 years (longer than an auto loan, but shorter than an average mortgage). An average home that uses 1,500kW/h per month requires a system with a capacity of 9.84kW. The estimated cost before incentives would be $68,859.58 (See Figure 15). If a loan for that amount were taken out for a fifteen-year period at 3.25% (current WSJ prime rate), the monthly payment would be $483.85 before any incentives are taken into account.

Many state's utility companies offer incentives (which may differ by location). In Figure 15, a 30% tax credit at the federal level combined with a 25% tax credit from the State of Arizona provides an attractive option for residential customers to pursue. APS (Arizona Public Service) also offers a rebate, which makes the post-incentive cost of the system $26,543.83. With federal, state and local rebates and incentives, the monthly payment would be $186.51.

The 25-year savings are based on the amount of electricity cost you would save over a 25-year period assuming a 4% annual rate increase. The savings may not be realized immediately, but an 11.97-year breakeven point and 278.09% 25-year ROI make it a wise investment for those that plan on remaining in their homes for the long-term.

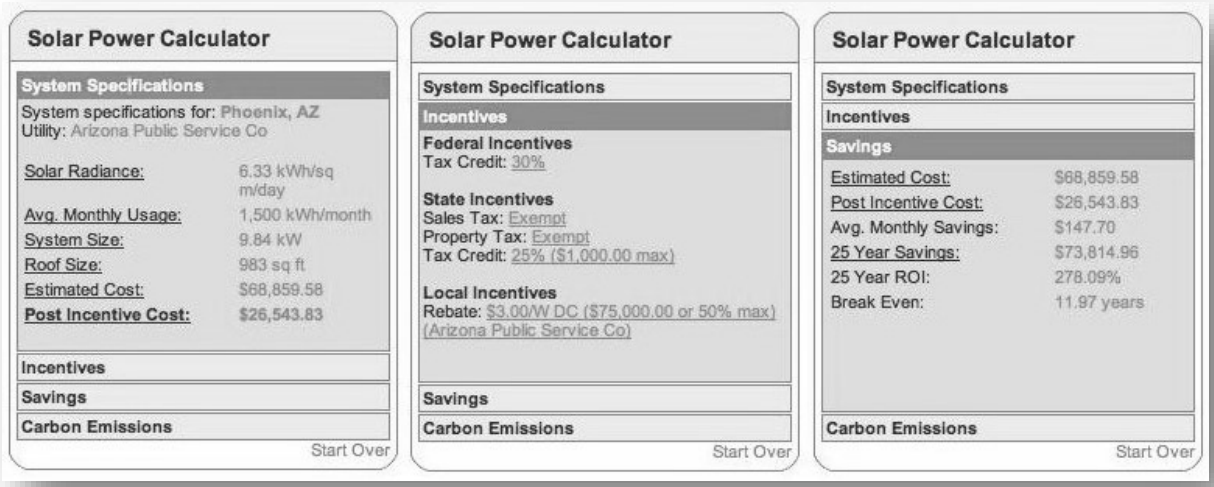


FIGURE 15

Fusion will partner with local integrators in targeted markets and hand-off financially qualified customers to these businesses to take a customer's project from concept to reality. Fusion will vet these integrators and guarantee their work to the customers of the platform.

PANEL WAREHOUSING AND DISTRIBUTION

Many integrators hold single line contracts with panel manufacturers in order to realize a greater cost savings. These existing agreements pose a slight problem to Fusion, as these integrators will be reluctant to relinquish these savings in order to join the Fusion platform. To combat this issue, Fusion will use the existing distribution and warehousing resources at First Solar to purchase panels at volume discounts from multiple manufacturers, and pass these savings on to the integrators. This will allow the integrators to be more nimble in their product offerings, as they will no longer be tied to a single line and can accommodate a customer's wishes without issue.

INTEGRATOR PORTAL

The major draw of Fusion, from an integrator perspective (besides qualified lead generation), are the benefits that the Fusion platform provides. In addition to the discounts on panels and the flexibility that being a multi-line integrator creates, Fusion will provide a portal to each integrator. This portal will present customer lead information and facilitate communication between the customer and the integrator. Fusion will be the conduit by which integrators communicate with their customers.

In addition, the portal will provide access to every web box that the integrator has installed as part of the Fusion platform. As mentioned before, a web box is an internet accessible circuit monitor that stores information about the power generated by a solar system and transmits it to an offsite location for viewing and analysis. These boxes also report on the overall health of the system, allowing for the early diagnosis of problems and proactive maintenance. Fusion will aggregate all

of the web boxes that an integrator has installed as part of the platform into a single dashboard with which an integrator can monitor and support their installations.

CUSTOMER COMMUNITY

The long-term viability of Fusion relies heavily on the health of the community that is created around solar energy and the web box technology that is provided to each converted customer of Fusion. Once a customer has input their data and begun the process of implementing a solar project, a profile is created where they can begin to blog about their experiences, post photos and video, and chat with other members of the community.

Once a customer has a web box installed as part of their project, the information gathered by the device becomes accessible as part of their profile and can be accessed from anywhere in the world through the website. This information is shared across the community and is made available in multiple formats. For example, the customer location data and web box information will be mashed up with Google Maps using their API to provide a map of all Fusion installations. Energy generated in specific geographic regions will also be presented.

These features help to lock the customer into the platform. It is this captive audience that Fusion will convert into a sustainable business model, with information functioning as the currency. A matrix of all stakeholder interaction mechanisms that exist within the Fusion platform can be observed in Figure 16.

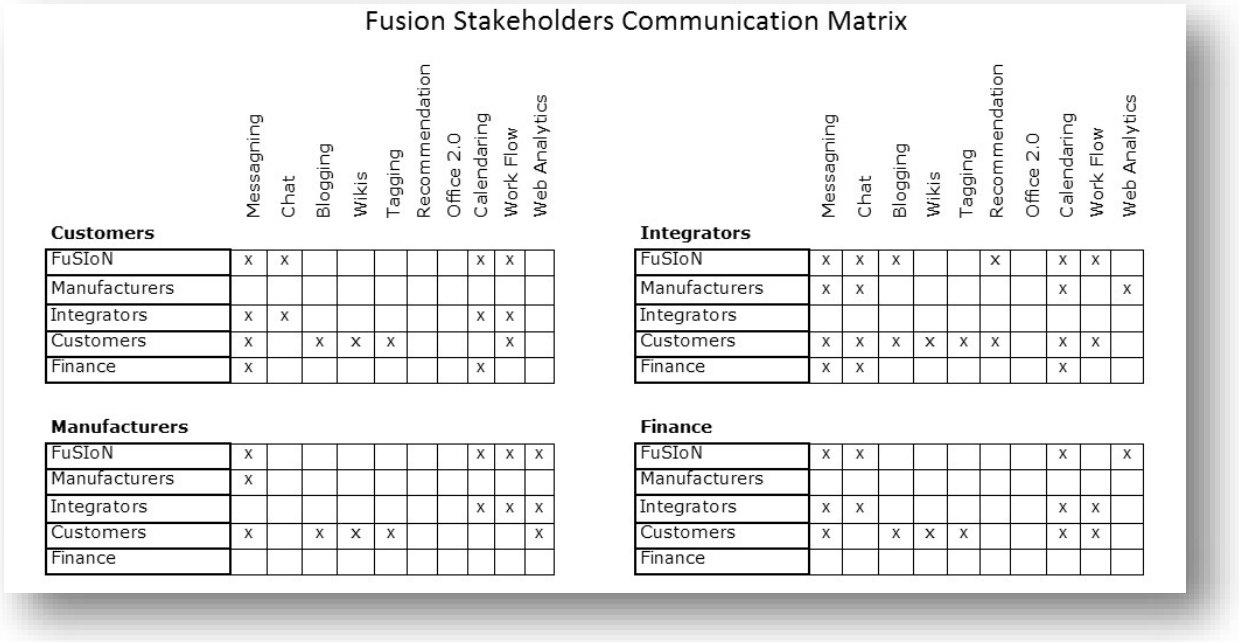


FIGURE 16: FUSION STAKEHOLDERS COMMUNICATION MATRIX

CUSTOMER INTERACTION NARRATIVE

Residential customers looking for information about solar power systems will be directed to Fusion.com by their favorite search engine. This will be accomplished by utilizing the advertising platforms in place at Google, Microsoft, and Yahoo to purchase ad-words and targeted banner advertising on related websites. Once a customer has navigated to Fusion.com, the site will ask them identifying questions to provide background information and create a personal profile. This information will allow the site to bubble up relevant information according to the customer's interests and present it to the customer without the need to dig for it. Throughout the viewing of this information, the site will assist the customer in creating a high-level plan for their solar project.

Once a customer has created a project plan, they move into the financial module of the platform. Here they will be presented with the financial grant programs and subsidies available to them in their geographic location. If additional financing is necessary, the customer will fill out a loan application and submit it on the site. Within an acceptable time frame, the site will respond back with an approved loan amount.

Finally, after the customer has been approved for financing and has settled on a plan, the site will present the customer with a list of local affiliate integrators to take the project from vision to implementation. The customer will select from the list of integrators, all of which are vetted and abide by the platform's standards. Fusion will then facilitate the customer's first contact with the chosen integrator by sending the customer's information to the integrator's dashboard.

Once the integrator and the customer have decided on a project plan, the integrator will contact Fusion and order the requested panels. In addition to the panels, Fusion will provide a pre-configured web box, at no cost, to the integrator to install as part of the customer's system. The integrator will then execute the installation of the customer's PV system. The installation will be completed from Fusion's perspective once the web box's communication with the platform has been confirmed.

Throughout the implementation phase of the project, Fusion staff will monitor the process and provide any additional assistance needed. This information is then fed back into the system as quality assurance for the integrators, and will help to move along delayed or stalled implementations. Customers will use their newly created community profile to blog about their experience and communicate with other members within the community.

Upon the completion of the project, both the integrator and the customer will continue to be tied to the Fusion platform. Customers will be able to access their PV system by means of their web box through their Fusion community profile. Integrators will also have access to their customers' web boxes through their integrator dashboard, and will monitor said web boxes in order to provide proactive maintenance to their customers. A visualization of the customer purchase life cycle can be seen in Figure 17.

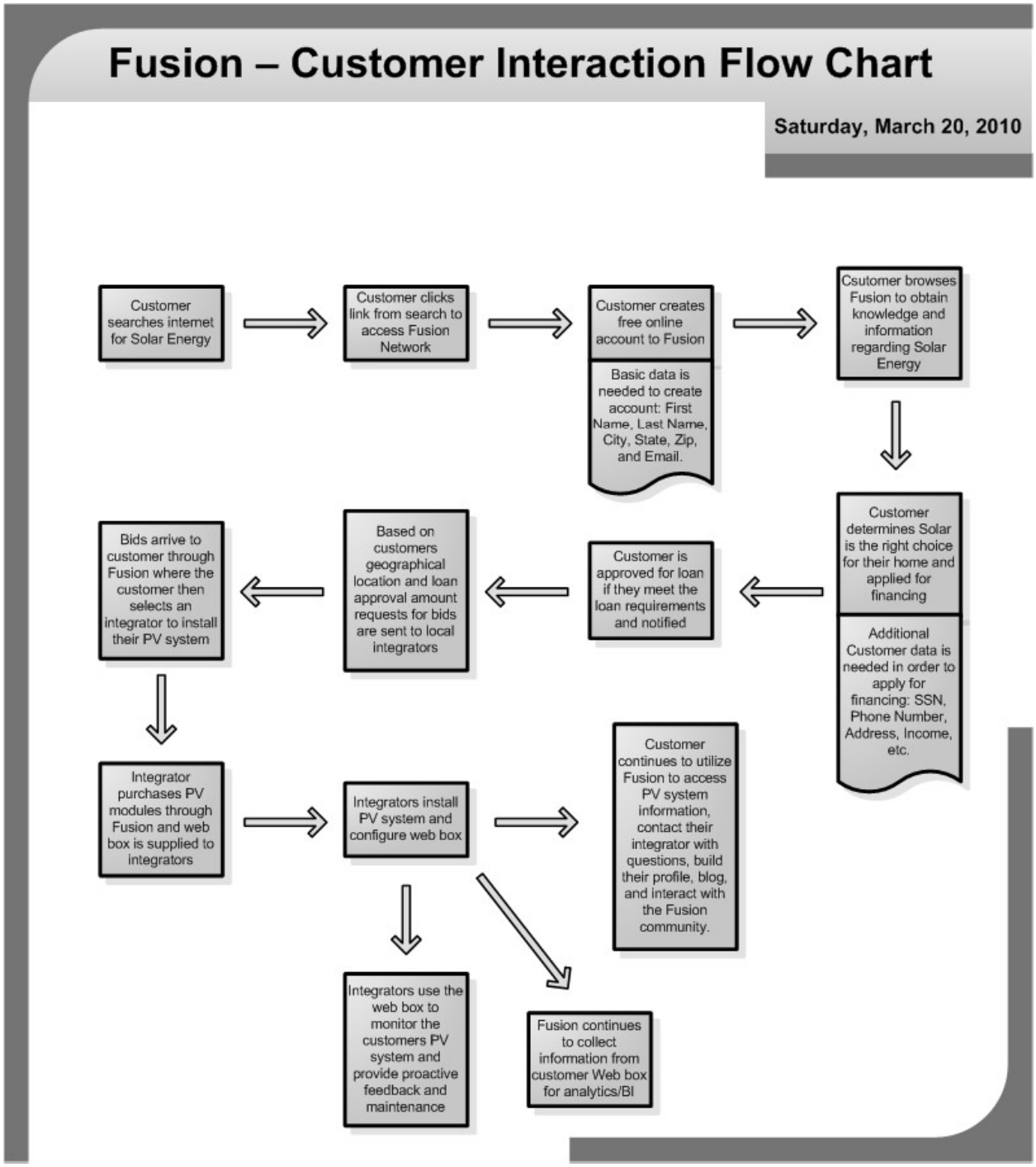


FIGURE 17: CUSTOMER INTERACTION FLOW CHART

There are four main stakeholders in the Fusion platform. They are, in no particular order, First Solar, manufacturers, consumers, and integrators. Each of these stakeholders derives unique value from Fusion, which can be concisely observed in Figure 18.

MANUFACTURERS

Manufacturers gain little from Fusion initially, except a new medium to sell their wares and the expected increase in overall US residential demand that Fusion will drive in the markets that it serves.

CONSUMERS

Consumers who chose to utilize Fusion will gain access to the most accessible store of information regarding solar technology and system installation, along with government subsidies and private financing if needed. Consumers who chose to follow through with the initial plans generated by Fusion will be connected to a trusted network of integrators that serve their geographic location. Consumers will also discover a new community of like-minded individuals that they can communicate and connect with. Once their project is complete, Fusion will give consumers easy access to the web box installed as part of their system.

INTEGRATORS

Partner integrators gain a conduit to financially qualified customers that they can convert into fully realized projects. The web box that is installed for every customer that uses Fusion provides a long-term value add with regards to service, as integrators can better serve their customers through monitoring of their dashboard and proactive maintenance of systems. Additionally, as Fusion will be distributing the panels to integrators with volume discounts realized intact, integrators can be free to use any panel that a customer chooses without decreasing margins significantly.

FIRST SOLAR

First Solar, as expected, realizes the most value in the Fusion platform. It provides an entirely new line of business that is completely decoupled from their current manufacturing operation. The product neutral nature of Fusion will result in goodwill in the industry and brand recognition from consumers. Most importantly, however, is the amount of rich information that the platform will provide to First Solar. Once sufficiently gathered, this information will be highly sought after, often from the stakeholders mentioned above. It is this endgame that is the real goal of Fusion.

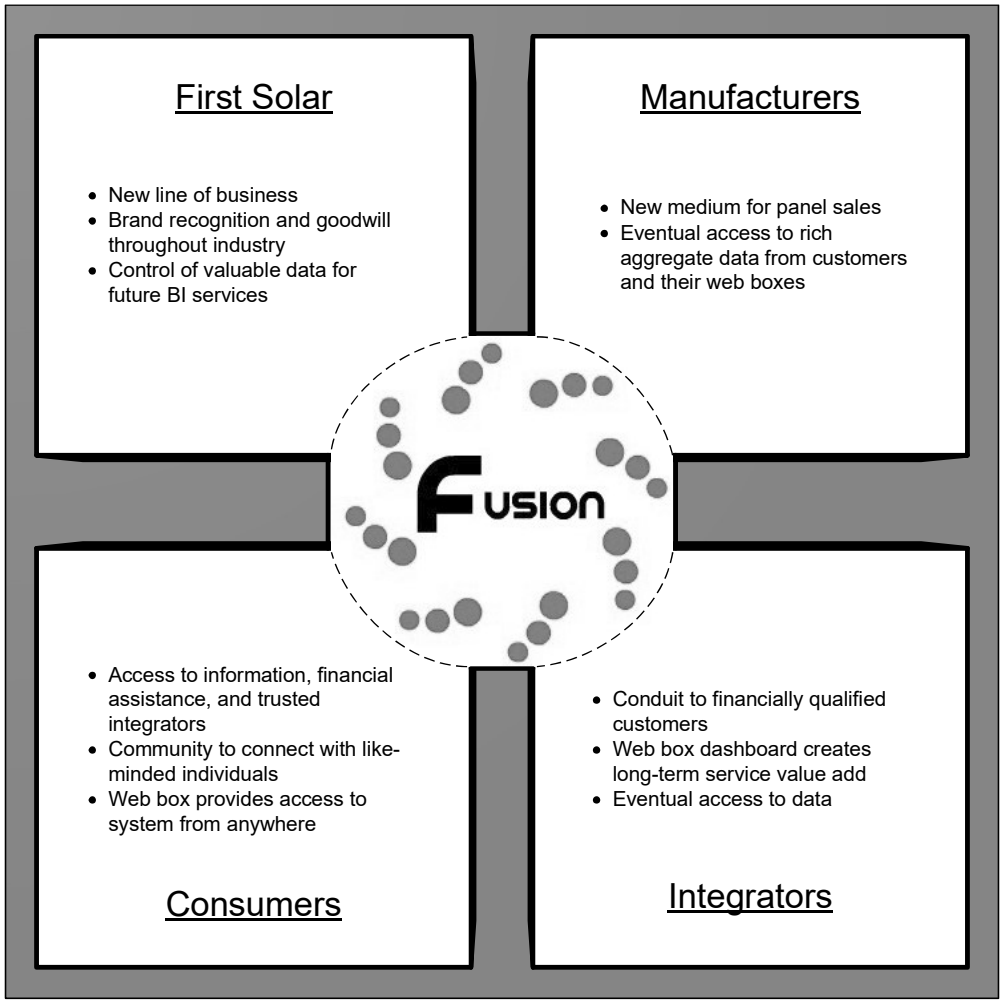


FIGURE 18: FUSION STAKEHOLDER DERIVED VALUE

FUTURE PLANS

One of the major long-term advantages to First Solar of this platform is the rich customer-specific information that Fusion will gather on participants of the platform. As the amount of information aggregates, business intelligence exercises will be run to help profile the types of customers visiting the site and better target them in future advertising campaigns. This will also help to identify future markets that Fusion will move into based on the geographic information captured.

As the information gathered by the web boxes begins to build up, this information will rapidly increase in value. It is expected that manufacturers, integrators, government institutions, and academic institutions will be willing to pay for access to this rich information source. Therefore, Fusion will begin to broker business intelligence services to these entities.

Additionally, our contacts at AllWest highlighted order management as a potential module to add to the integrator dashboard. This increased functionality would allow integrators to keep track of all orders placed with Fusion distribution for panels.

Finally, after a successful rollout in specific markets for residential projects, Fusion will investigate the viability of the platform in the small and medium business markets. These projects tend to be

more complex and have different requirements, both technically and financially, than the residential projects supported by version one of the platforms. After gaining sufficient experience with this new endeavor, this is another potential market that First Solar could break into to help diversify their customer base.

METRICS TO MEASURE SUCCESS

In order to track the success of Fusion and to promote partnerships between banks, integrators, and First Solar, many key performance metrics can be tracked and reported. Fusion cannot be successful if customers do not find the information they need on the site. It will not succeed if banks will not finance customers, and if integrators won't use Fusion as a source of sales generation. These metrics will work together to show how Fusion generates customer interest and most importantly sales.

The first indicator is if Fusion is generating enough customer interest. In order to determine the amount of customer interest the number of unique hits Fusion gets on a day-to-day basis will be tracked. The percentage of unique hits that register for an account with Fusion compared to the number of unique visitors will also be tracked. Finally, customer interest can also be gauged by the average amount of time registered users spend on the site signed in. This can be used to show the potential customer base Fusion is creating.

Next, in order to get banks involved Fusion will track the number of customers that take the next step and apply for pre-qualified financing. Banks, of course, will use their own metrics to calculate how successful the loans are to them. Fusion is a loan generating source for the banks to make money. By showing banks how many customers Fusion attracts and what percentage of those customers ask for financing, Fusion can spark interest from banks and potentially build a relationship with those banks.

In order to entice integrators to partner with Fusion an important metrics will be the percentage of registered users versus the percentage of users who are pre-qualified. Integrators have difficulty finding qualified customers, but if Fusion can provide those pre-qualified customers to the integrators then partnering with Fusion would be beneficial to the integrators.

Pipeline analysis could provide very important information to First Solar in regards to how successful Fusion is. The number of customers in the pipeline and at which phase of the purchasing process each customer is at would be very useful information. There are four phases customers pass through within Fusion. The first phase is creating an account on Fusion. Tracking this phase would show the number of people interested in solar energy. The next phase will provide the number of clients in the pipeline who are pre-qualified for financing. The third phase of the pipeline will provide the number of customers requesting a bid from the integrators and the number of customers who accepted a bid from an integrator. Finally, the number of clients exiting the pipeline (PV systems being installed or installed) and the sales revenue generated would be obtainable. It would also be worthy to note the average number of days each customer is in certain phases of the pipeline and the overall number of days in the pipeline all together.

First Solar would also measure the success of Fusion by tracking the several aspects. One such aspect would be the increase in revenue from sales generated by Fusion. Another would be the percentage of market share obtained and the percent increase within the residential market.

Online customer satisfaction surveys would also be used to determine how satisfied customers are with their experience on Fusion and used to improve the Fusion experience.

The metrics would work together to build a supporting case for banks and integrators to partner with First Solar's Fusion network and for First Solar to measure the success of their e-hub.

POTENTIAL IMPACT OF TRANSFORMATION

Areas of improvement for First Solar's competitive advantage in the solar energy market:

1. First Solar's position in the residential market is limited to a partnership with Solar City. This relationship has helped them to create a recognizable brand image; however, First Solar is still not a household name. Fusion would further First Solar's brand recognition by increasing consumer interaction with First Solar in the residential market.

2. This implementation of Fusion will diversify First Solar from simply providing large scale production and integration, to providing education, resources and products to all levels of solar supply chain.

A Resource-based view of the firm from the Competitive advantage standpoint is when a company uses its resources and capabilities to create an advantage through superior value creation. These resources are created from firm specific assets that few competitors can acquire. The Fusion network of manufacturers, integrators, financiers and consumers would represent such an asset.

FIRST SOLAR WOULD HAVE A FIRST MOVER ADVANTAGE (FMA)

FMA is a concept wherein an initial entrant into a market segment is able to gain a significant portion of share, thus restricting the ability of followers to match the initial mover's success. This advantage can also be realized by the ability for a first mover to gain control of resources, and restrict access to the resources needed to create a said product. First Solar would be the first in the market with an integrated community platform, and therefore First Solar would have a marked advantage over competitors trying to replicate its business model.

First Solar should have a sense of urgency to pursue the FMA strategy. This strategy could potentially place them in a leadership role within a growing industry. However, due to the diminishing returns on technology, the FMA strategy around the integrated community platform does not provide First Solar a long-term sustainable advantage. In the long term, First Solar would need to create a sustainable revenue model using the Fusion platform. This can be achieved by implementing integrator and consumer-based subscription fees and providing Business Intelligence fee-based services.

FIRST SOLAR WOULD BECOME MUCH MORE AGILE

According to Cisco, there are three major parts that make up the benefit to a company to rollout a new IT platform. In our recommendation, we suggest the implementation of a new integrated community platform that will transform the way that First Solar relates to the multiple levels of stakeholders. Despite the level of relationship, the three components Cisco identifies that represent a remarkable impact in the way First Solar would interact with its stakeholders. These three components signify the importance for a company to remain agile and mobile, and explain in detail the reasons why a portal would help change First Solar's current landscape.

1. Standardization-Standardization increases asset *efficiency* by providing useful guidelines for IT implementation. Investments in training personnel, integration, components, and support can be extended across the enterprise. For example, a company with various resources distributed across multiple silos can combine these resources to benefit the larger environment. As a consequence, IT manpower, resources, and incremental investments in the delivery of services are all better utilized.

2. Consolidation and Virtualization Network resources and services can be used efficiently and securely by integrating data, voice, and video transport onto a single IP platform. The elimination of information and physical "silos" provides a more flexible, integrated, service-oriented infrastructure that decreases complexity and ongoing costs while increasing overall effectiveness.

3. Extended Services and Design-scalable design, support, and integration services offered through partners and finance programs deliver a complete solution.
    - From Cisco.com, Retrieved February 23rd, 2010: http://www.cisco.com/en/US/prod/collateral/modules/ps2706/ps6526/prod_brochure0900aecd805287d2.html.

FIRST SOLAR WOULD BECOME MORE FLEXIBLE WITH ITS DATA

Looking at the project in its initial stages, one might suggest a CMMI model to determine the level of integration to be implemented. This structure will allow First Solar to grow, and make changes to cater to BI analytics results. Information should guide the decisions of the company, allowing for executives to make prompt decisions that can positively impact the P/E for shareholders. Gathering demographics will position First Solar in a unique market position where there is little competition.

According to Ed Daugavietis, a senior analyst with Info-tech research group, the areas in which spending has increased are those that "…empower users and make the infrastructure more flexible."

This integrated community platform would become a working CRM. "(A CRM) solution that lets your employees turn customer data into business intelligence is "like vitamins in the morning," says analyst Michael Speyer of Cambridge, Massachusetts-based Forrester Research: It won't guarantee your company's health, but it can certainly boost performance."
http://www.microsoft.com/canada/midsizebusiness/businessvalue/budget_maximum_agility.mspx

As Fusion grows, First Solar will evaluate the data gathered for better decision making and this will allow critical insight into their business models. This insight will assist management to identify areas of improvement within the organization, and help drive First Solar into becoming a 'best of breed' company.

DETAILS OF PROPOSED TECHNOLOGY

The Fusion platform is highly leveraged on technology, as the entire project relies on it, and value is created for stakeholders by it. A high-level overview of the proposed logical technology plan can be observed in Figure 19.

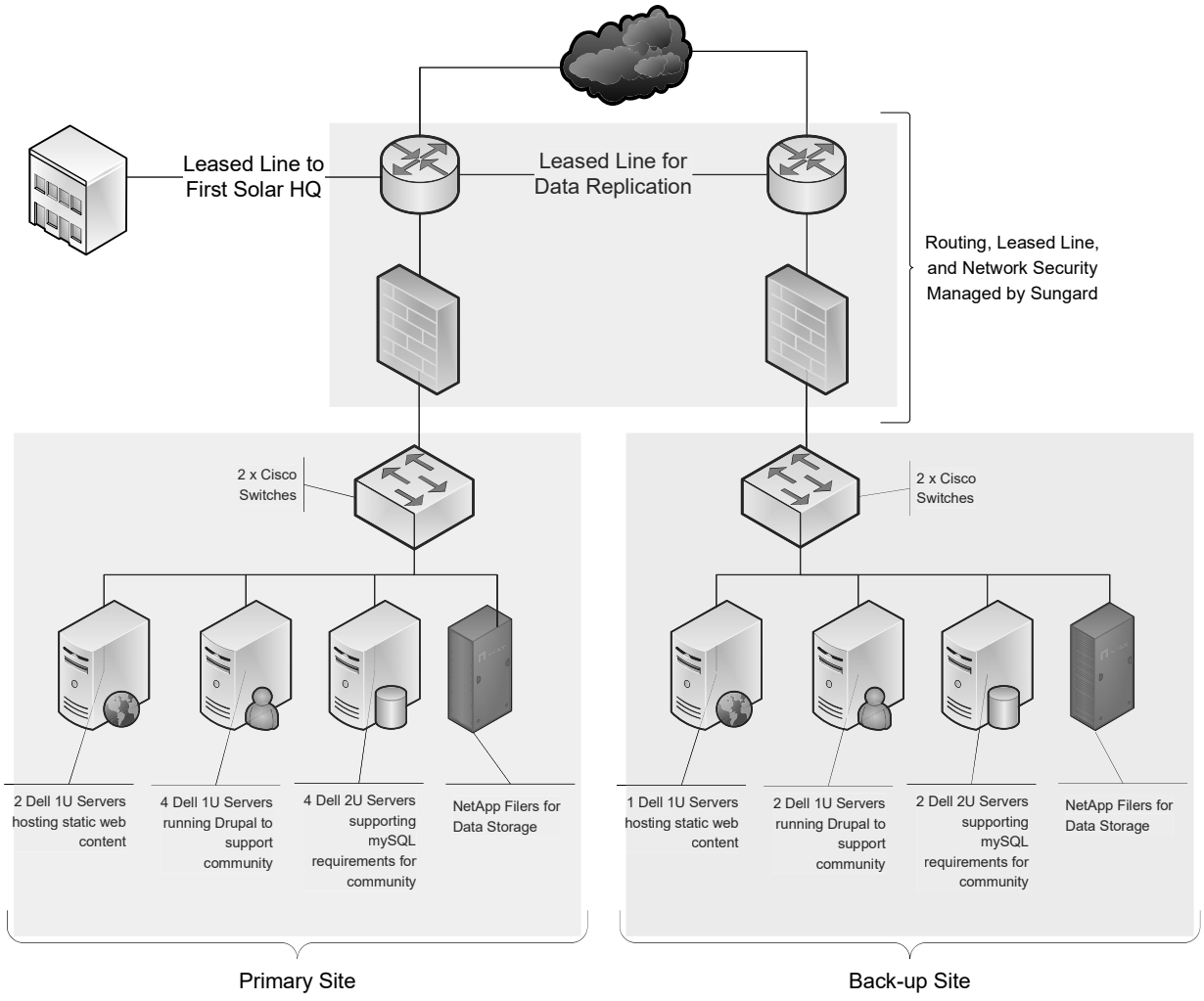


FIGURE 19: FUSION LOGICAL ARCHITECTURE

MANAGED DATA CENTER SERVICES

Creating and supporting a top tier data center environment to house the Fusion platform is not one First Solar's core competencies. As such, co-location data center space will be leased to offset the financial risk of building one from scratch. Sungard, a managed co-location company, is highlighted specifically for the value-added services that they provide to their customers.

Sungard offers high-level routing and security services to customers who lease space in their data centers. First Solar will take advantage of a number of these services, as the capital investment to create them and the human capital to support them would be too great initially.

RAISED FLOOR DATA CENTER CAGES

First Solar will lease two cages in geographically significant data centers. The primary site will reside in Sungard's Phoenix data center due to its proximity to First Solar's corporate headquarters. The back-up site will reside in one of Sungard's three data centers in Carlstadt, New Jersey. Each location will house a 300 square foot cage, or approximately enough room to fit 12 racks for servers. Only 4 racks will be needed initially in each cage, with the rest flagged for growth. Sungard will provide the racks as growth dictates. A proposed layout for the cages is provided in Figure 20.

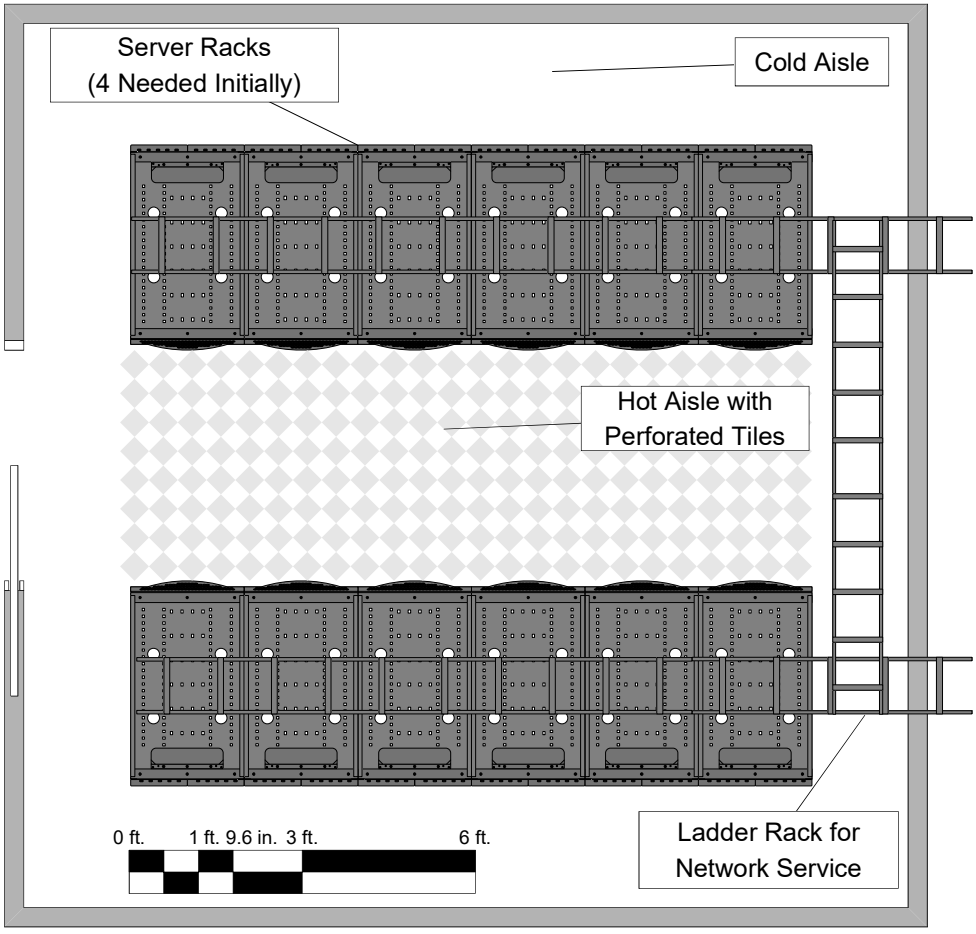


FIGURE 20: FUSION CO-LOCATION CAGE DESIGN

CLOUD CONNECTIVITY AND BANDWIDTH

Sungard will manage core networking responsibilities for the Fusion platform, as well as provide all of the requisite bandwidth. A dedicated leased line, likely a DS3 (44.736 Mbits/sec), will be provided to allow for data replication to the back-up site. This will allow for a fully redundant set of data to swing to in the event the primary Fusion instance is taken offline due to hardware failure, natural disaster, etc. From a security standpoint, Fusion will utilize Sungard's managed NOC product to negate against attacks and external compromises, providing firewall and intrusion prevention (IPS) services.

A separate DS2 (6.312 Mbits/sec) leased line, not provided by Sungard, will be run between First Solar HQ and the primary site to allow for hardware configuration and management, as well as data extraction for business intelligence exercises.

HARDWARE

As is detailed in Figure 17, a combination of Cisco, Dell, and NetApp hardware will be required at each site. A Cisco switching infrastructure capable of delivering network redundancy to each device in the cage will be required. At minimum, two Cisco 4948 switches will be needed in each cage for the initial platform deployment, with additional switches added as needed.

Dell servers will be used to run the information site, community, and databases. At the primary site, two Dell PowerEdge R610 1U (1.75") servers will be used, each providing the ability for 10,000 concurrent users to utilize the services provided. Servers will be added to this cluster as traffic dictates. To power the community portion of the platform, four Dell PowerEdge R610 servers will be used, each providing for 5,000 concurrent users. In addition, four Dell PowerEdge R710 2U (3.5") servers will be used to execute all of the database calls and queries generated from the site and community. As with the primary site, all other clusters will scale up as concurrent user counts increase.

The final piece of the hardware puzzle is a Network Attached Storage (NAS) system provided by NetApp. This device will house all of the databases and tables for the website and community, as well as house the aggregate data gathered from the web boxes.

As a rule of thumb, half of the equipment landed at the primary site will also be needed at the back-up site. This will allow for site functionality to be maintained, albeit at a lower level, in the event of an unplanned downtime event. The only exception to this rule is the NetApp system, which will need a duplicate amount of hardware at each site for full data replication.

SOFTWARE

The Fusion platform will use primarily open-source software in an attempt to reduce the operating costs of the hardware. All Dell servers will be provisioned with a Linux operating system server distribution, most likely CentOS. This server OS does not require a license fee to use, which will save thousands of dollars every year for First Solar.

The primary website will be written largely in XHTML and PHP, two common website development languages. In keeping with the open-source theme, the community site will be created using the popular content management system (CMS) Drupal. Again, this will reduce year-over-year licensing fees for the servers. Drupal provides an extensible framework with which to build a community site, offering many pre-built conduits into popular sites like Twitter and Facebook, drastically decreasing the development time required. The magazine Popular Science, the editorial organization Fast Company, and NASA have all used the Drupal platform to great success for large sites. The Fusion platform will be developed utilizing the matrix shown in Figure 16 to ensure that all desired forms of stakeholder communication are supported. Drupal requires MySQL to operate, an open-source option for database creation and management, which will be installed on all database servers.

First Solar will utilize their existing SAP installation to facilitate order management and billing for the panel distribution aspect of the Fusion platform. Plans are in place in the future to extend this functionality to the integrator dashboard so that it is easily accessible to partners.

HUMAN CAPITAL

In this section we will expand on the Human Capital side of the Fusion project. We will examine the necessary human capital requirements for a project of this scope, along with the training and development needed to reach each milestone outlined above. We have identified several key roles, drawn an organizational chart and proposed a budget containing reasonable salaries as defined by Payscale.com (2010). While the job descriptions are specific to the Fusion project, we anticipate First Solar will have the ability to pull resources from existing staff within the company, keeping recruiting costs and advertising expenses low.

There will be four main areas of personnel needed to complete the Fusion project. The first tier, Executive Management, is already in place with the CIO being ultimately responsible for all aspects of the project. In addition to the CIO, the VP of Collaborative Business functions as a liaison between various projects within First Solar, allowing for implementation of cross departmental collaboration.

The second tier consists of a Director and Project Analyst. While the Director reports to management and carries the requirements for the project on his shoulders, the Project Analyst operates with some autonomy reporting directly to the CIO. The Analyst will also create reports on progress and areas of improvement for the Director when needed. The reason for having these two roles operating independently is to create an objective viewpoint to highlight success and failures in an unbiased manner.

The third tier consists of project managers in various departments. These roles report to the Fusion director, and will typically function to oversee a particular aspect of the project. They will allocate resources, organize budgets and keep projects on time. Their main objective is to supervise the workflow of small objectives that are within their core areas of expertise.

The fourth tier is comprised of team leads, and their respective teams. These teams report to the project managers, and are comprised of highly trained leaders and specialized team employees with in depth knowledge that relates to the particular subject matter they are working on. While

their main focus is centered on projects within their specific teams, additional projects may be catered toward any areas within the Fusion project.

Below we have outlined more specific detail around the roles of each participant and their impact on the overall success of the Fusion project.

CHIEF INFORMATION OFFICER, CIO

Within the hierarchy of First Solar, there is already a CIO. However, for the scope of the Fusion project, the CIO's main duty will be the oversight and ultimate responsibility for policies, procedures, timelines and budgets. The majority of the information the CIO will be working with is important to the front facing image of First Solar. Put another way, the CIO's view of the health of the project will impact the response of the CEO, thus affecting shareholder value. The CIO will send reports and data to the CEO with regard to Fusion and this data will be used to determine quarterly forecasts for investors and the Board of Directors.

VICE PRESIDENT OF COLLABORATIVE BUSINESS

This role is designed to give First Solar the ability to un-silo their cross departmental projects by performing an independent analysis. This C-Level position reports information to upper management, specifically tailoring reports and data to reflect areas of improvement. This cross disciplinary position allows the VP to suggest, reference, and promote cross departmental collaboration. This data will allow First Solar to make use of knowledge intensive business process (KIPS) already in place within the organization, and allow those best practices to be shared amongst new projects.

DIRECTOR

This role is comprised of an individual with extensive project management experience, minimally a PMP certification. This role would have 10-15 years of experience managing multiple departments, budgets, people and initiatives within a diverse array of industries. This director would be involved in much of the high-level planning and implementation of milestones, budgeting and technology. His/her advice would be funneled directly to the CIO, and feedback would reflect his/her particular insight into the overall success or failure of the project. The Director would also work closely with the Head Project analyst to review progress and goals. Ultimate responsibility for the success or failure of the project lies with the director.

HEAD PROJECT ANALYST

The head Project Analyst role is designed to serve in a very autonomous and objective role. This position would ideally report directly to the CIO, but would work with the Director when needed. The goal of this position is to bring in an unbiased way to assess and critique the project's progress based upon metrics established by management. The Project Analyst should possess several years of experience in analyzing data, reports, generating and using various metrics. This position could potentially be outsourced, but for cost constraints we recommend keeping the position internal.

SERVICE ANALYST

Reporting directly to the Head Project Analyst, the Service Analyst would assess and conduct analysis of the service and quality within Fusion.com.

FINANCIAL ANALYST

Reporting directly to the Head Project Analyst, the Financial Analyst would most likely possess a CPA and have a general knowledge of GAAP and Sarbanes-Oxley. This position would conduct quantitative analyses of information directly related to the finances of the project.

IT MANAGER

The purpose of this Technical Lead position is to provide technical leadership and direction to all facets of Fusions IT team. This manager would collaborate with all Fusion stakeholders to help ensure that business projects and processes achieve both local and organization wide business application requirements. Provides the necessary leadership required for the development of and implementation of technology strategies, policies, principles and security issues within a B2B and B2C framework.

SALES MANAGER

The First Solar Sales Manager will direct the actual distribution or movement of a product or service to the customer. He/she will coordinate a sales plan, formulate sales strategies and increase new clients by establishing sales territories, quotas, and goals. Throughout the sales process, the Sales Manager will analyze sales statistics to determine sales potential and monitor sales team.

SERVICE MANAGER

The First Solar Service Manager will focus on customer service operations, which deals directly with customers and is the first point of contact. These customers can be Manufacturers, residential consumers and integrators. The Service Manager will develop and implement processes and procedures to improve operational efficiency of the First Solar service model. They will also monitor customer interactions to resolve issues raised by customers.

ADMINISTRATOR, DBA, DATA/SECURITY LEADS

These three roles will work with the IT lead on projects with regard to the hardware/software of Fusion. They will install, configure, troubleshoot, and maintain the Fusion database system. Other duties will include implementation of systems, system configuration, data replication, data backup, partitions, storage, and access. They should also monitor and optimize system performance of system security and set user privileges within the database/system environment.

CUSTOMER, INTEGRATOR, FINANCE SERVICE, SUPPLIER LEADS, SALES, IMPLEMENTATION, FINANCE LEADS

First Solar's Leads will ensure delivery of excellent service through fast and accurate processing of orders, inquires and excellent communication. These leads will coordinate with other departments to resolve customer inquiries. Each of these leads will focus on ensuring the members of their team become the first point of customer contact regarding Fusion. Each lead will manage their teams and maintain business relationship with new and existing clients.

Human Capital Budget			
Director	1	@ $ 120,000.00	$ 120,000.00
Program Analyst	1	@ $ 70,000.00	$ 70,000.00
Analyst 1	2	@ $ 60,000.00	$ 120,000.00
Manager 1	3	@ $ 60,000.00	$ 180,000.00
Lead 1	10	@ $ 50,000.00	$ 500,000.00
Team Employee 1	32	@ $ 30,000.00	$ 960,000.00
		Total first year Exp.	$ 1,950,000.00

FIGURE 21: HUMAN CAPITAL BUDGET, YEAR 1

The success of the project hinges on the ability of First Solar to obtain and recruit high talent employees. Without employee buy-in, the project will see limited success. Company culture will play a large role in the way the project progresses. Despite this being a unique project, employees should still feel an overall connection with existing First Solar employees. Therefore, from the hiring, training and benefit perspectives, employees working on the Fusion project will use the existing HR employee infrastructure. Training of Employees will be conducted by the existing staff of HR specialists within First Solar. This will reduce costs, but also enable First Solar to begin the project with limited hiring and requisition down-time. A detailed organizational chart is included in Figure 22.

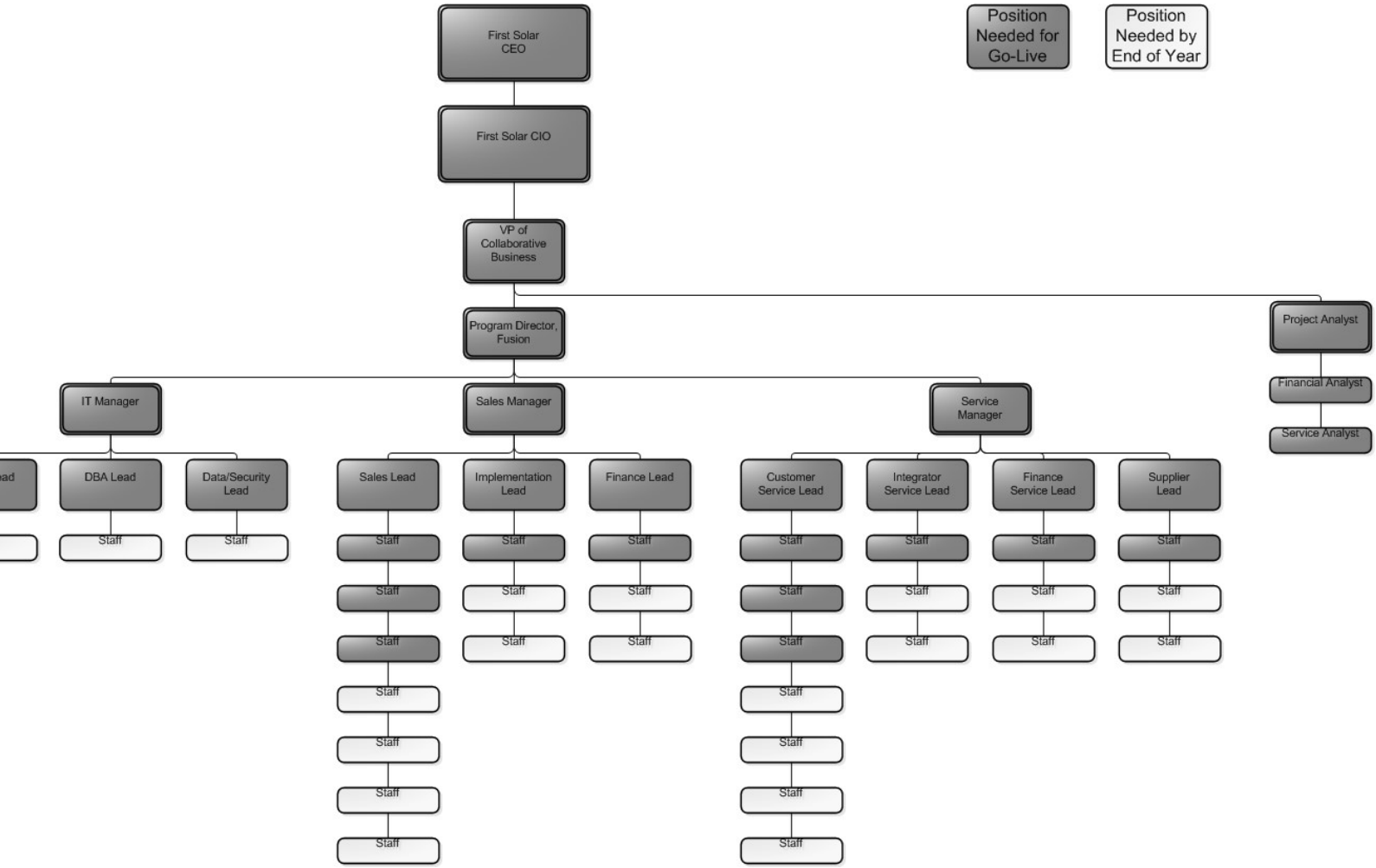

Position Needed for Go-Live
Position Needed by End of Year
First Solar CEO
First Solar CIO
VP of Collaborative Business
Program Director, Fusion
Project Analyst
Financial Analyst
Service Analyst
IT Manager
Sales Manager
Service Manager
DBA Lead
Data/Security Lead
Sales Lead
Implementation Lead
Finance Lead
Customer Service Lead
Integrator Service Lead
Finance Service Lead
Supplier Lead
Staff

FIGURE 22: FUSION ORGANIZATIONAL STRUCTURE

FINANCIAL FORECASTING

Fusion will realize revenue from three core sources; a .25% margin on system installations, a $125 quarterly integrator subscription fee, and a $10 per month access fee for consumers with web boxes. Our forecast for consumers and integrators utilizing the platform and the revenue they generate through the end of 2014 is presented in Figure 23.

	Markets	Integrators	Customers	Integrator Revenue	Customer Revenue	Quarterly Earnings	Annual Integrator Revenue	Annual Customer Revenue	Annual Earnings
Q3 '10	1	25	750	$3,125	$22,500	$25,625			
Q4 '10	3	75	3000	$9,375	$90,000	$99,375	$12,500	$112,500	$125,000
Q1 '11	6	150	7500	$18,750	$225,000	$243,750			
Q2 '11	9	225	14250	$28,125	$427,500	$455,625			
Q3 '11	12	300	23250	$37,500	$697,500	$735,000			
Q4 '11	15	375	34500	$46,875	$1,035,000	$1,081,875	$131,250	$2,385,000	$2,516,250
Q1 '12	18	450	48000	$56,250	$1,440,000	$1,496,250			
Q2 '12	21	525	63750	$65,625	$1,912,500	$1,978,125			
Q3 '12	24	600	81750	$75,000	$2,452,500	$2,527,500			
Q4 '12	27	675	102000	$84,375	$3,060,000	$3,144,375	$281,250	$8,865,000	$9,146,250
Q1 '13	30	750	124500	$93,750	$3,735,000	$3,828,750			
Q2 '13	33	825	149250	$103,125	$4,477,500	$4,580,625			
Q3 '13	36	900	176250	$112,500	$5,287,500	$5,400,000			
Q4 '13	39	975	205500	$121,875	$6,165,000	$6,286,875	$431,250	$19,665,000	$20,096,250
Q1 '14	42	1050	237000	$131,250	$7,110,000	$7,241,250			
Q2 '14	45	1125	270750	$140,625	$8,122,500	$8,263,125			
Q3 '14	48	1200	306750	$150,000	$9,202,500	$9,352,500			
Q4 '14	51	1275	345000	$159,375	$10,350,000	$10,509,375	$581,250	$34,785,000	$35,366,250

FIGURE23: CONSUMER AND INTEGRATOR REVENUE FORECAST

This model assumes that Fusion will expand into three new markets every quarter after Q4 2010. Twenty-five integrators will be brought on in each market that Fusion serves, and each of these integrators will complete ten customer projects per month.

Taking into account the first-year budgets for labor and equipment, a 5-year overall profit and loss forecast can be estimated. This forecast can be observed in Figure 24.

Year-by-year profit and loss assumptions	2010	2011	2012	2013	2014
Annual cumulative inflation (expense) increase	-	2.00%	4.00%	6.00%	8.00%
Interest rate on ending cash balance	0.50%	0.50%	0.50%	0.50%	0.50%

		2010	2011	2012	2013	2014
Revenue						
Gross revenue of System Installations		*$206,832,500*	*$2,170,350,000*	*$4,650,750,000*	*$7,131,150,000*	*$9,611,550,000*
Cost of System Installations (.25% Gross Margin)		*206,183,250*	*2,164,924,125*	*4,639,123,125*	*7,113,322,125*	*9,587,521,125*
Gross margin		*$649,250*	*$5,425,875*	*$11,626,875*	*$17,827,875*	*$24,028,875*
Integrator Subcriptions ($125 per quarter)		$12,500	$131,250	$281,250	$431,250	$581,250
Customer Subcriptions ($10 per month)		$112,500	$2,385,000	$8,865,000	$19,665,000	$34,785,000
Interest income		$0	$0	$0	$0	$0
Total revenue		*$774,250*	*$7,942,125*	*$20,773,125*	*$37,924,125*	*$59,395,125*
Operating expenses						
Sales and marketing		$250,000	*$255,000*	*$265,200*	*$281,112*	*$303,601*
Payroll and payroll taxes		1,000,000	*$1,950,000*	*$2,500,000*	*$3,000,000*	*$3,500,000*
IT Capital Expenditures		662,000	*$675,240*	*$702,250*	*$744,385*	*$803,935*
IT Service Expenditures		272,200	*$544,400*	*$566,176*	*$600,147*	*$648,158*
Total operating expenses		*$2,184,200*	*$3,424,640*	*$4,033,626*	*$4,625,643*	*$5,255,695*
Earnings before taxes		*($1,409,950)*	*$4,517,485*	*$16,739,499*	*$33,298,482*	*$54,139,430*
Taxes on income	*30%*	*0*	*1,355,246*	*5,021,850*	*9,989,545*	*16,241,829*
Net income (loss)		*($1,409,950)*	*$3,162,240*	*$11,717,650*	*$23,308,937*	*$37,897,601*

FIGURE 24: FUSION 5 YEAR PROFIT/LOSS FORECAST

FUSION ROLL-OUT PLAN

In the first quarter of implementation First Solar will focus on signing contracts for hosting services, configuring network infrastructure, and installing servers. The first phase will be to obtain the hardware and build out the infrastructure to support the front of site for Fusion. By the end of the first quarter, the front of site is expected to be completed and ready for customers to register accounts.

In the second quarter, Fusion's sales team will market Fusion to customers and to integrators. During this phase Fusion's sales teams will contact as many integrators as possible to demo Fusion and obtain subscriptions from them at an annual fee of $500. First Solar will also build up a small initial inventory of PV panels from several manufacturers which would be sold to integrators. Sales of these panels will have a very small markup (a quarter of a percent). During this time, roll out of Fusion to the Phoenix market will be carefully laid out. Phoenix was chosen as the test market because of the proximity to First Solar headquarters.

At the end of the 6th month, Fusion will be rolled out to the Phoenix market. First Solar will monitor the success of Fusion using key performance metrics for the next 3 months and planning will begin on the roll out of Fusion to 2 more markets; Los Angeles and San Diego.

If the roll out to Phoenix is successful, months 9 through 12 will be used to roll out Fusion to Los Angeles and San Diego and the same KPM used to monitor the success of Phoenix will be used to monitor the success of Los Angeles and San Diego. A timeline of the first 12 months of implementation can be observed in Figure 25.

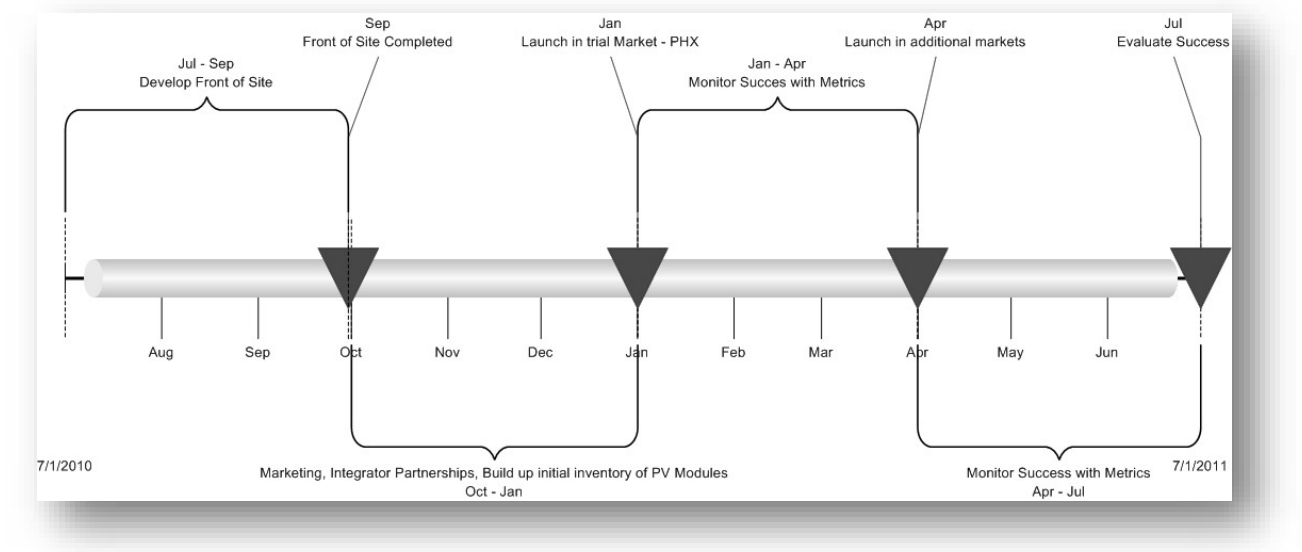


FIGURE 25: FUSION IMPLEMENTATION TIMELINE

From that point on, First Solar will introduce Fusion to 3 new markets each quarter using the same process that was used to roll out to Phoenix, Los Angeles, and San Diego.

PROGRESS METRICS

In order to monitor the success of Fusion there were several key performance metrics that were identified. These metrics are list below along with how they will be measured:

NUMBER OF UNIQUE VISITORS TO FUSION EACH DAY

Using tools such as Web-stat or Google Site Analytics Fusion will be able to track the number of unique hits received daily. This is tracked just by the number of people who visit the website based on their IP and MAC addresses.

NUMBER OF NEWLY REGISTERED USER ACCOUNTS PER DAY

Using an in-house ERP tool or tying in Fusion with First Solar's current CRM application the number of newly created accounts on Fusion can be tracked to provide information about the number of customers who are interested in solar energy. This is tracked by the number of users to sign up for an account on Fusion.

AVERAGE AMOUNT OF TIME REGISTERED USERS SPEND ON FUSION

Using tools such as Web-stat or Google Site Analytics Fusion will be able to track the average amount of time registered users and guests spend on Fusion. This information would be useful for advertising purposes and the quality of information on Fusion. It could also be used to determine the potential willingness of the customer to pursue financing and bids for a PV system. Average amount of time spent on Fusion is calculated by tracking the time the customer logs into Fusion and remains logged in.

REGISTRATION RATE PERCENTAGE

Registration rate is the number of guests who register for Fusion. For example, if 2 guests visit Fusion and 1 registers Fusion would have a 50% registration rate. This could be measured using an in-house ERP tool or tying in Fusion with First Solar's current CRM application

PERCENTAGE OF REGISTERED USERS WHO APPLY FOR FINANCING

Using First Solar's CRM this determined by tracking the number of registered users who apply for financing and dividing that buy the total number of registered user account on Fusion.

PERCENTAGE OF REGISTERED USERS WHO ARE QUALIFIED FOR A LOAN

Using First Solar's CRM this is calculated by tracking the total number of registered users who applied for a financial loan divided by the number of registered users who applied and approved.

PERCENTAGE OF FINANCIALLY QUALIFIED USERS WHO PURCHASED A PV SYSTEM

Using First Solar's CRM this is calculated by tracking the number of registered users who purchased a solar system divided by the number of users who are registered and were approved for financing.

INCREASE IN COMPANY VALUE FROM FUSION SALES

ROI – Is determined using First Solar's ERP system and is calculated by dividing the profit of Fusion by the amount invested in Fusion over a period of a year represented as a percentage.

ROE – Calculate the average Common shareholder equity from the balance sheet or Statement of Shareholders Equity. Take Net Income from the income statement. Divide Net Income by the Average common shareholder equity

Return on Stockholders Equity – Take Net Income and divide it by the total equity

SALES GROWTH

Sales Revenue – Calculate sales revenue growth month to month and year to year.

Percentage of sales growth over the last year – The amount of sales in current year divided by the amount of sales in the past year.

IMPROVE PROFITABILITY

% net income - The amount of net income in current year divided by the amount of net income in the past year.

% operation expenses - The amount of OE in current year divided by the amount of OE in the past year.

PERCENTAGE OF MARKET SHARE OBTAINED IN THE SOLAR INDUSTRY

Sales revenue for industry and MW/GW produced.

PERCENTAGE OF MARKET SHARE INCREASE IN THE RESIDENTIAL MARKET

Sales revenue for market, MW/GW produced in market, and number of households utilizing Fusion.

CUSTOMER AND INTEGRATOR SATISFACTION

Measured through the use of surveys.

CONCLUSION

Tie in with SWOT analysis. Focus on how we have addressed the challenges presented to us from the SWOT. How does fusion take care of those, and leverages the network for future opportunities.

Are they ready for change? Explain our attempt to contact First Solar…include our questions and email from Melanie.

Wall street journal…First Solar Flies to close to the sun…Icarus

Make a big deal about Fusion as a glue in the marketplace. Will facilitate the growth that the market is going to experience…

Is now the right time for this to be implemented.

Creating value for emotional. Job, career, Cause.

Additional Notes: Delete Ying li, Delete Management, Include Appendix B Financials in Appendix A.

APPENDIX A: INVESTMENT ANALYSIS

CONDUCTED ON 10/4/2009

DIRECT COMPETITOR COMPARISON

	SunPower SPWRA	First Solar FSLR	SunTech STP	Yingli YGE
Market Cap:	2.66B	12.70B	2.30B	1.52B
Employees	5,400	3,524	9,070	4,704
Qtrly Rev Growth (yoy):	-22.20%	96.90%	-33.20%	-24.60%
Revenue (ttm):	1.29B	1.73B	1.65B	N/A
Gross Margin (ttm):	24.88%	55.77%	14.99%	17.80%
EBITDA (ttm):	201.89M	769.84M	137.70M	N/A
Oper Margins (ttm):	8.89%	39.16%	5.20%	N/A
Net Income (ttm):	69.05M	577.21M	-11.93M	N/A
EPS (ttm):	0.79	6.93	-0.068	N/A
P/E (ttm):	34.85	21.65	N/A	N/A
PEG (5 yr expected):	0.76	0.58	3.19	N/A
P/S (ttm):	2.14	7.05	1.42	N/A

Yingli Green Energy Advisors, Inc.—www.yinglisolar.com
(YGE)
11.69
Down 0.18 (1.52%)
High 16.35
Low 2.50
Market Cap 1.52B

View: **Annual Data** | Quarterly Data

All numbers in thousands

PERIOD ENDING	31-Dec-08	31-Dec-07
Net Income	**97,730**	**53,330**
Operating Activities, Cash Flows Provided by or Used In		
Depreciation	43,332	18,023
Adjustments To Net Income	47,112	35,481
Changes In Accounts Receivables	(38,108)	(183,351)
Changes In Liabilities	68,964	279
Changes In Inventories	(12,793)	(47,076)
Changes In Other Operating Activities	(65,866)	(208,962)
Total Cash Flow from Operating Activities	**140,371**	**(332,275)**
Investing Activities, Cash Flows Provided by or Used In		
Capital Expenditures	(285,862)	(133,533)
Investments	(302)	(278)
Other Cashflows from Investing Activities	(38,095)	39,572
Total Cash Flows from Investing Activities	**(324,259)**	**(94,239)**
Financing Activities, Cash Flows Provided by or Used In		
Dividends Paid	-	-
Sale Purchase of Stock	-	289,333
Net Borrowings	215,055	261,642
Other Cash Flows from Financing Activities	-	-
Total Cash Flows from Financing Activities	**215,055**	**550,975**
Effect Of Exchange Rate Changes	(9,498)	(3,464)
Change In Cash and Cash Equivalents	**$21,669**	**$120,997**

MR. LIANSHENG MIAO
Chairman and Chief Executive Officer

Mr. Liansheng Miao is the chairperson of our board of directors and the founder, vice chairperson and chief executive officer of Tianwei Yingli New Energy Resources Co., Ltd., our principal operating subsidiary ("Tianwei Yingli"). Prior to founding Tianwei Yingli in 1998, Mr. Miao was the chairperson of Yingli Group. Mr. Miao is an executive director of the Photovoltaic Committee of the China Renewable Energies Association, vice chairperson of the China Rural Area Electricity Supply Association and vice chairperson of the China Cells Industry Association. Mr. Miao is also a director of the Hebei New and High Technology Industry Association and a director of the New Energy Chamber of Commerce of All-China Federation of Industry and Commerce. Mr. Miao studied business management in Beijing Economics Institute and received his master's degree in business administration from Beijing University in China.

MR. XIANGDONG WANG
Director and Vice President

Mr. Xiangdong Wang is a director and vice president of us and Tianwei Yingli. Prior to joining Tianwei Yingli in 2001, he worked as the general accountant for Baoding Public Transportation Co., a PRC company that provides urban public transportation services, Baoding Coal Co., a PRC company engaged in the purchase and distribution of liquefied petroleum gas and liquefied natural gas, and Baoding Sewage Treatment Plant, a sewage treatment facility, each located in Baoding, China. Mr. Wang received his bachelor's degree in economics from China People's University in China, and received his master's degree in economics from Hebei University in China.

MR. ZHIHENG ZHAO
Vice President

Mr. Zhiheng Zhao is a vice president of us and Tianwei Yingli. He was the head of the project department of Tianwei Baobian, a manufacturer of large electricity transformers and the holder of the minority interest in Tianwei Yingli, and later became the factory manager, overseeing the production of special transformers. Mr. Zhao worked as also the vice president of Tianwei Baobian, general manager of the Baoding Electric Transformer Manufacturing Company, an electricity transformer manufacturer, and general manager of the Baoding Special Converter Manufacturing Factory, a manufacturer of special electricity converters, each located in Baoding, China. Mr. Zhao studied management engineering and graduated from East China Institute of Heavy Machinery in China.

MR. ZONGWEI LI
Director and Chief Financial Officer

Mr. Zongwei Li is the chief financial officer of us and Tianwei Yingli. Prior to joining us in November 2006, Mr. Li served as senior audit manager and audit manager at the accounting firm of PricewaterhouseCoopers for eleven years. From 2002 to 2004, Mr. Li worked at PricewaterhouseCoopers, New York, as audit manager. Mr. Li graduated from the mechanical engineering department of Shanghai Institute of Technology and from the international finance and insurance department of Shanghai Institute of Business and Administration. Mr. Li received his master's degree in business administration from Olin School of Business of Washington University.

MR. JINGFENG XIONG
Vice President of Technology

Mr. Jingfeng Xiong is our Vice President of Technology. He joined us in 2000. In his eight years at the Company, he has served in a variety of roles, including as the Manager for Wafer, Cell, and Module Workshops, respectively, Quality Manager, Technical Department Manager, System Application Department Manager, and Chief Engineer, gaining extensive experience. Mr. Xiong has an especially solid understanding of each step of our manufacturing process and of all the related equipment. And he has initiated and led research and development projects for optimizing operation and automating our vertically integrated production lines resulting in improved yield rates, cost savings and increased cell convention efficiencies. He received a bachelor's degree in electronics from Hebei University.

DR. DENGYUAN SONG
Chief Technology Officer

Dr. Dengyuan Song is the chief technology officer of Yingli Green Energy and Tianwei Yingli. Dr. Song has more than 27 years of experience in the research and development of solar cells, silicon materials, and semiconductor PV devices in both Australia and China, including nearly 10 years of research and development in silicon-based solar cells, polycrystalline silicon thin-film solar cells and third-generation solar cells at the ARC Photovoltaics Centre of Excellence at the University of New South Wales in Sydney, Australia. Prior to joining University of New South Wales, Dr. Song served as a professor at Hebei University in China, where his teaching and research covered a broad spectrum of topics, including solar cells, silicon materials, photoelectric devices and automation engineering. Dr. Song has published and presented over 150 papers in scientific and technical journals and at various PV industry conferences. He received his bachelor's degree in microelectronics engineering in 1982 from Hebei University and his doctorate degree in photovoltaic engineering in 2005 from University of New South Wales in Australia.

MR. SEOK JIN LEE
Chief Operating Officer

Mr. Seok Jin Lee is the chief operating officer of us and Tianwei Yingli. Prior to joining us in October 2006, Mr. Lee worked at Hyundai Heavy Industries Co., Ltd., a heavy industry equipment manufacturer in Korea, as a general manager for solar business, electric hybrid car business planning and management, feedstock supplies development and supply chain management from 2004 to 2006, a general manager for merger and acquisition activities from 2000 to 2004, and a project manager from 1984 to 2000. Mr. Lee received his bachelor's degree in electrical engineering from Busan University in Korea and his master's and doctorate degrees in electrical engineering from Yonsei University in Korea.

MR. YIYU WANG
Chief Strategy Officer

Mr. Yiyu Wang is the Chief Strategy Officer of us. Prior to joining us in December 2006, Mr. Wang worked as a senior audit manager and an audit manager at the accounting firm of PricewaterhouseCoopers since 1996. From 2003 to 2004, Mr. Wang worked at PicewaterhouseCoopers in Sydney, Australia. Mr. Wang received his bachelor's degree in international finance from Shanghai University in China.

MR. STUART BRANNIGAN
Managing Director

Mr. Stuart Brannigan is the managing director of Europe of Yingli Green Energy. Prior to joining Yingli Green Energy, Mr. Brannigan was the director of global procurement for Phoenix Solar AG, in Sulzemoos, Germany. Mr. Brannigan also had a successful career with BP Solar from 1990 to 2005. In his last two years with BP Solar, he served as the director for global procurement, responsible for securing silicon feedstock, wafers, cells, modules, and all other PV-related raw materials and capital equipment. Between 1999 and 2003, Mr. Brannigan was the vice president of sales for Europe and Africa at BP Solar. Additionally, during his tenure at BP Solar, Mr. Brannigan was elected to the board of the European Photovoltaic Industry Association (EPIA), where he was responsible for representing, lobbying and voicing the opinions of EPIA around the world.

First Solar, Inc.—www.firstsolar.com
(FSLR)
150.00
Up 6.24 (4.34%)
High 207.51
Low 85.28
Market Cap 12.7B

View: **Annual Data** | Quarterly Data

All numbers in thousands

PERIOD ENDING	27-Dec-08	29-Dec-07	30-Dec-06
Net Income	**348,330**	**158,354**	**3,974**
Operating Activities, Cash Flows Provided by or Used In			
Depreciation	59,518	24,481	10,210
Adjustments To Net Income	22,023	(46,757)	12,650
Changes In Accounts Receivables	(40,960)	11,003	(28,149)
Changes In Liabilities	209,908	87,907	17,028
Changes In Inventories	(84,762)	(19,832)	(9,742)
Changes In Other Operating Activities	(50,990)	(9,205)	(6,547)
Total Cash Flow from Operating Activities	**463,067**	**205,951**	**(576)**
Investing Activities, Cash Flows Provided by or Used In			
Capital Expenditures	(459,271)	(242,371)	(153,150)
Investments	175,830	(299,379)	(6,844)
Other Cashflows from Investing Activities	(25,000)	(5,500)	-
Total Cash Flows from Investing Activities	**(308,441)**	**(547,250)**	**(159,994)**
Financing Activities, Cash Flows Provided by or Used In			
Dividends Paid	-	-	-
Sale Purchase of Stock	16,036	376,142	332,750
Net Borrowings	97,196	14,611	101,998
Other Cash Flows from Financing Activities	64,317	39,668	16,802
Total Cash Flows from Financing Activities	**177,549**	**430,421**	**451,550**
Effect Of Exchange Rate Changes	(20,221)	7,050	391
Change In Cash and Cash Equivalents	**$311,954**	**$96,172**	**$291,371**

MANAGEMENT TEAM

MICHAEL J. AHEARN
Executive Chairman of the Board

ROBERT "ROB" J. GILLETTE
Chief Executive Officer

Rob Gillette joined First Solar in October 2009 as Chief Executive Officer. Prior to coming to First Solar, Mr. Gillette served as President and CEO of Honeywell Aerospace. He joined Honeywell in 1996 and has served in a number of senior management positions, including President and CEO of Honeywell Transportation Systems, President of Honeywell Turbo Technologies, and he also served the Turbo business as Vice President of Strategic Growth and Vice President/General Manager, Asia.

BRUCE SOHN
President

Bruce Sohn joined First Solar in February 2007 as President. Mr. Sohn was formerly a senior executive at Intel Corporation and has served on First Solar's Board of Directors since 2003. He was a technical and managerial consultant to the company prior to joining the management team. Mr. Sohn is responsible for technology development, manufacturing, expansion, quality, EHS, supply chain, MIS and worldwide human resources. He heads operations for First Solar's module business.

JOHN GAFFNEY
Executive Vice President

Mr. Gaffney leads First Solar's sustainable development and environmental affairs activities, as well as the legal and corporate development departments.

First Solar's sustainable development activities center on the company's commitment to extended producer responsibility. An early achievement was the design and implementation of First Solar's voluntary end-of-life module collection and recycling program.

MAJA WESSELS
Executive VP, Public Affairs

Maja Wessels leads First Solar's government affairs and community relations activities globally. Ms. Wessels joined First Solar as Vice President of Government Affairs for the Europe, Middle East and Africa region in May 2008 after serving 4 years as senior vice president, Government Affairs at Honeywell for the EMEA region and three as President, United Technologies International Operations for Europe. Ms. Wessels chaired the American Electronics Industry Association Europe from 2006 to 2007.

CAROL CAMPBELL
Vice President, Human Resources

Carol Campbell joined First Solar in March 2006 as Director of Human Resources and was named Vice President of Human Resources in March 2007. Prior to joining First Solar, she was the Regional Director of Human Resources for North America at the Dana Corporation, where she was responsible for all Dana plants in the US, Canada, and Mexico. Ms. Campbell was with Dana for 20 years, progressing through levels of greater responsibility in the Legal and Human Resource Departments.

MARY BETH GUSTAFSSON
Vice President, General Counsel

Mary Beth Gustafsson joined First Solar in October 2008 as Vice President, General Counsel. Ms. Gustafsson was previously Senior Vice President, General Counsel and Secretary of Trane (formerly American Standard Companies, Inc.). Prior to that, she held roles as Chief Counsel of Trane's commercial and residential air conditioning systems business worldwide and Chief Corporate Counsel for corporate legal activities, including acquisitions, joint ventures and alliances and financing transactions.

JENS MEYERHOFF
Chief Financial Officer

Jens Meyerhoff joined First Solar in May 2006 as Chief Financial Officer. Prior to joining First Solar, Mr. Meyerhoff was the Chief Financial Officer of Virage Logic Corporation, a leader in embedded infrastructure intellectual property, from January 2006 to May 2006. Mr. Meyerhoff was employed by FormFactor, Inc., a manufacturer of advanced wafer probe cards, as Chief Operating Officer from April 2004 to July 2005, Senior Vice President of Operations from January 2003 to April 2004.

Suntech Power Holdings, Inc. – www.suntech.com
(STP)
13.98
Down 0.25 (1.76%)
High 35.68
Low 5.06
Market Cap 2.3B

View: **Annual Data** | Quarterly Data

All numbers in thousands

PERIOD ENDING	31-Dec-08	31-Dec-07	31-Dec-06
Net Income	**88,200**	**171,275**	**106,002**
Operating Activities, Cash Flows Provided by or Used In			
Depreciation	58,600	27,313	11,373
Adjustments To Net Income	104,400	16,262	9,239
Changes In Accounts Receivables	(348,800)	(226,601)	(144,904)
Changes In Liabilities	111,400	55,502	10,977
Changes In Inventories	(94,100)	22,809	(133,348)
Changes In Other Operating Activities	(91,000)	(75,634)	(28,217)
Total Cash Flow from Operating Activities	**(171,300)**	**(9,073)**	**(168,878)**
Investing Activities, Cash Flows Provided by or Used In			
Capital Expenditures	(333,800)	(162,697)	(52,341)
Investments	(271,400)	(51,994)	(2,845)
Other Cashflows from Investing Activities	(36,600)	(26,197)	(79,595)
Total Cash Flows from Investing Activities	**(641,800)**	**(240,888)**	**(134,781)**
Financing Activities, Cash Flows Provided by or Used In			
Dividends Paid	-	(64)	-
Sale Purchase of Stock	5,200	14,076	11,980
Net Borrowings	790,000	533,046	160,698
Other Cash Flows from Financing Activities	-	-	-
Total Cash Flows from Financing Activities	**795,200**	**547,058**	**172,678**
Effect Of Exchange Rate Changes	4,700	(1,662)	(2,813)
Change In Cash and Cash Equivalents	**($13,200)**	**$295,436**	**($133,794)**

DR. ZHENGRONG SHI
Chairman of the Board
Chief Executive Officer

Dr. Zhengrong Shi is Suntech's founder, chairman of the board of directors and chief executive officer. Prior to founding Suntech in 2001, he was a research director and executive director of Pacific Solar Pty., Ltd., an Australian PV company engaged in the commercialization of next-generation thin film technology, from 1995 to 2001. From 1992 to 1995, he was a senior research scientist and the leader of the Thin Film Solar Cells Research Group in the Centre of Excellence for Photovoltaic Engineering at the University of New South Wales in Australia, the only government-sponsored PV industry research center in Australia.

Dr. Shi is the inventor for 11 patents in PV technologies and has published or presented a number of articles and papers in PV-related scientific magazines and at conferences. He received a bachelor's degree in optical science from Changchun University of Science and Technology in China in 1983, a Master's degree in laser physics from the Shanghai Institute of Optics and Fine Mechanics, the Chinese Academy of Sciences in 1986, and a Ph.D. degree in electrical engineering from the University of New South Wales in Australia in 1992.

AMY YI ZHANG
Chief Financial Officer

Amy Yi Zhang has been Suntech's chief financial officer since August 2005 and a director on the board since February 2007. From 2004 to 2005, Ms. Zhang was a director and the chief financial officer of Deloitte Consulting China and was responsible for the management of various departments, including finance, accounting, human resources and IT, as well as back-office management and general office administration. From 1999 to 2004, she was the chief financial officer of Atos Origin China, and from 1997 to 1999, she worked as the financial controller of Atos Origin China. Ms. Zhang received her bachelor's degree from Nanjing University in China in 1989 and a Master's degree in business administration from the joint MBA program of Webster University and Shanghai University of Finance & Economics in 1998.

DR. STUART WENHAM
Chief Technical Officer

Dr. Stuart Wenham has been the chief technical officer since July 2005. Dr. Wenham is also currently a Scientia Professor and the Director of the Centre of Excellence for Advanced Silicon Photovoltaics and Photonics, at the University of New South Wales in Australia. From 1995 to 2004, he was the co-director of Research at Pacific Solar Pty. Ltd. From 1999 to 2003, he was the head of School for Photovoltaic Engineering and the director of the Key Centre for Photovoltaic Engineering at the University of New South Wales. From 1996 to 1998, he was the head of the Electronics Department and from 1991 to 1998, the associate director of the Photovoltaics Special Research Centre, also at the University of New South Wales. In 1999, Dr. Wenham received The Australia Prize for Energy Science and Technology and in 1998, the Chairman's Award at the Australian Technology Awards, in both cases jointly with Martin A. Green. Dr. Wenham received his Ph.D. degree in electrical engineering and computer science from the University of New South Wales in Australia in 1986.

STEVEN CHAN
President Global Sales/Marketing & Chief Strategy Officer

Mr. Steven Chan has been with Suntech for over three years and is currently the President, Global Sales/Marketing and Chief Strategy Officer. Mr. Chan is focused on enhancing and solidifying Suntech's long term focus to be a leading solar energy company. His primary responsibilities include the global sales and marketing organization, strategy and business development, and investor relations functions. As part of Suntech's three headquarters structure, Mr. Chan is responsible for the Americas region and is based out its San Francisco, CA headquarters. Mr. Chan had been previously based in Suntech's Wuxi, China headquarters.

Prior to joining Suntech, Mr. Chan worked at CDC Corporation, a NASDAQ-listed, Greater China-based enterprise software and online/mobile services company, most recently serving as its Acting CEO and previously as its General Counsel and Company Secretary. Prior to that, Mr. Chan was a New York-qualified corporate attorney with Morrison & Forester LLP and Milbank, Tweed, Hadley & McCoy LLP. Mr. Chan graduated from the University of California at Berkeley and received a JD law degree from the Boston College Law School.

SunPower Corporation – us.SunPowercorp.com
(SPWRA)
27.53
Down 0.03 (.11%)
High 77.00
Low 18.50
Market Cap 2.66B

View: **Annual Data** | Quarterly Data

All numbers in thousands

PERIOD ENDING	28-Dec-08	30-Dec-07	31-Dec-06
Net Income	**92,293**	**9,202**	**26,516**
Operating Activities, Cash Flows Provided by or Used In			
Depreciation	71,477	57,585	21,053
Adjustments To Net Income	68,346	73,671	4,848
Changes In Accounts Receivables	(48,895)	(158,967)	(26,182)
Changes In Liabilities	129,918	101,626	26,455
Changes In Inventories	(98,999)	(87,033)	(9,586)
Changes In Other Operating Activities	(60,493)	6,288	(81,055)
Total Cash Flow from Operating Activities	**153,647**	**2,372**	**(37,951)**
Investing Activities, Cash Flows Provided by or Used In			
Capital Expenditures	(265,549)	(193,484)	(108,307)
Investments	90,085	(118,007)	(26,496)
Other Cashflows from Investing Activities	(150,326)	(162,627)	(6,542)
Total Cash Flows from Investing Activities	**(325,790)**	**(474,118)**	**(141,345)**
Financing Activities, Cash Flows Provided by or Used In			
Dividends Paid	-	-	-
Sale Purchase of Stock	(1,554)	174,130	201,300
Net Borrowings	53,411	410,495	-
Other Cash Flows from Financing Activities	41,524	-	-
Total Cash Flows from Financing Activities	**93,381**	**584,625**	**201,300**
Effect Of Exchange Rate Changes	(4,121)	6,739	-
Change In Cash and Cash Equivalents	**($82,883)**	**$119,618**	**$22,004**

THOMAS H. WERNER
Chief Executive Officer, Director

Thomas H. Werner has served as SunPower Corporation's chief executive officer and as a member of the SunPower Board of Directors since June of 2003. Prior to joining SunPower, he held the position of chief executive officer of Silicon Light Machines, Inc., an optical solutions subsidiary of Cypress Semiconductor Corporation. Previously, Werner was vice president and general manager of the Business Connectivity Group of 3Com Corp., a network solutions company. He has also held a number of executive management positions at Oak Industries, Inc., and General Electric Co., and currently serves as a board member of Cree, Inc., Silver Spring Networks and Silicon Valley Leadership Group. Werner holds a bachelor's degree in industrial engineering from the University of Wisconsin, Madison, a bachelor's degree in electrical engineering from Marquette University and a master's degree in business administration from George Washington University.

DENNIS V. ARRIOLA
Sr. Vice President and Chief Financial Officer

Dennis V. Arriola joins SunPower as its senior vice president and chief financial officer (CFO). In this role, he leads the company's global finance, planning and accounting organizations. Previously, Arriola was senior vice president and CFO at San Diego Gas & Electric and Southern California Gas Co., Sempra Energy's California regulated utilities, where he was instrumental in building the finance and treasury teams, which included accounting, planning and budgeting, strategic development, risk management, information technology, and procurement. Arriola earned a master's degree in business administration from Harvard University and a bachelor's degree in economics from Stanford University. He also serves as a trustee for the Tomás Rivera Policy Institute in Los Angeles, and as a member of the board of directors of the San Diego Symphony. He was recently named one of the top 100 most influential Hispanics by HispanicBusiness.com.

MARTY T. NEESE
Chief Operating Officer

Marty T. Neese joined SunPower in 2008 and is responsible for leading SunPower's global strategic operations and worldwide materials sourcing, and will oversee the execution of its recently announced solar cell fabrication plant in Malaysia. He brings more than 25 years of experience driving cost effective, scalable manufacturing processes and policies. Most recently, Neese held the position of executive vice president, worldwide operations, for Flextronics International. Prior to that, he was executive vice president, operations at Solectron Corp., where he was responsible for the daily cost, quality, delivery, and end-to-end supply chain optimization and performance for customers who were partnered with the company. Previously, Neese held the positions of vice president, worldwide program management and sales operations at Sanmina-SCI Corp., and director, business development for Jabil Circuit Co. He also served in the U.S. Army for five years, reaching the rank of Captain. Neese is a graduate of the United States Military Academy at West Point. He received his master's degree in business administration from the University of Florida.

DR. RICHARD SWANSON
President and Chief Technical Officer

Richard Swanson received his Ph.D. in Electrical Engineering from Stanford University in 1974. In 1976, he joined the faculty at Stanford University where he and his group conceived and developed the point-contact solar cell. Laboratory versions of these cells achieved a record 28 percent conversion efficiency in concentrator cells and 23 percent large-area one-sun cells. In 1991, Dr. Swanson resigned from his faculty position to devote full time to SunPower Corporation, a company he founded to develop and commercialize cost-effective photovoltaic power systems. Dr. Swanson currently serves as its President and Chief Technical Officer. Along with his students and co-workers, he has published more than 200 articles in journals and conference proceedings, as well as several book chapters. In 2002, Dr. Swanson was awarded the William R. Cherry award by the IEEE for outstanding contributions to the photovoltaic field, and in 2006 the Becquerel Prize in Photovoltaics from the European Communities.

HOWARD WENGER
President, Global Business Units

As President of Global Business Units, Wenger is responsible for driving SunPower's growth and revenue generation, scaling the company's rapidly growing sales organization and developing SunPower's outbound channels for the residential, commercial and power plant markets. Previously, he served as SunPower's senior vice president, global business units, and as executive vice president and a member of the Board at PowerLight Corp. prior to its purchase by SunPower in 2007. Under his leadership, SunPower's revenue has grown substantially quarter on quarter and Wenger has been instrumental in negotiating and securing contracts with major retail outlets and utility-scale power plant customers. Wenger's past experience includes vice president, North America, for AstroPower, Inc., prior to its acquisition by General Electric. During his tenure there, he guided the company to be a leader in the on-grid solar power market. He co-founded Pacific Energy Group, an energy consulting firm noted for defining and implementing public policies and legislation to mainstream solar power. Wenger also worked for PG&E in both photovoltaic research and strategic planning, and served as an invited researcher at the Ben-Gurion National Solar Energy Center in Israel, working with some of the world's leading solar scientists. He earned a bachelor's degree in environmental studies from the University of California, Santa Barbara, and a master's degree in engineering from the University of Colorado, Boulder.

BRUCE R. LEDESMA
General Counsel

Mr. Ledesma serves as General Counsel for SunPower. Previously, he was General Counsel for PowerLight Corporation. Prior to joining PowerLight, Mr. Ledesma served as the Executive Vice President and General Counsel of Barra, Inc., a publicly traded financial risk management company. Prior to becoming General Counsel, he ran the Barra Ventures unit in a business capacity and led the company's efforts in strategic partnerships, alliances, and all merger and acquisition activities. Mr. Ledesma also spent several years practicing as a corporate and securities attorney for the global law firm Latham & Watkins, where he represented private and public companies involved in domestic and international transactions, as well as public and private debt and equity securities offerings. Mr. Ledesma holds a B.A. in economics from Stanford University and a J.D. from Harvard Law School.

DOUGLAS J. RICHARDS
Vice President of Human Resources

Douglas J. Richards joined SunPower Corp. in 2007 and serves as the company's vice president of human resources and corporate services. In this role, Richards is responsible for leading all Human Resources initiatives, driving Corporate Services and managing the company's Facilities organization worldwide. Prior to joining SunPower, Richards was vice president of human resources and administration for SelectBuild, a $1.8 billion wholly owned subsidiary of BMHC, a company that serves 19 of the top 25 high-volume builders. Previously, Richards held strategic positions at BlueArc, Compaq Computer Corp and Apple Computer, Inc. He has more than 21 years of experience developing and driving key HR programs for Fortune 100 companies and venture-backed startups. Richards graduated from California State University, Chico, with a bachelor's of arts degree in public administration.

FIRST SOLAR, INC. AND SUBSIDIARIES

Consolidated Statements of Operations

	Year Ended		
	December 27, 2008	December 29, 2007	December 30, 2006
	(In thousands, except per share amounts)		
Net sales	$1,246,301	$503,976	$134,974
Cost of sales	567,908	252,573	80,730
Gross profit	678,393	251,403	54,244
Operating expenses:			
Research and development	33,517	15,107	6,361
Selling, general and administrative	174,039	82,248	33,348
Production start-up	32,498	16,867	11,725
Total operating expenses	240,054	114,222	51,434
Operating income	438,339	137,181	2,810
Foreign currency gain	5,722	1,881	5,544
Interest income	21,158	20,413	2,648
Interest expense, net	(509)	(2,294)	(1,023)
Other income (expense), net	(934)	(1,219)	(799)
Income before income taxes	463,776	155,962	9,180
Income tax expense (benefit)	115,446	(2,392)	5,206
Net income	$ 348,330	$158,354	$ 3,974
Net income per share:			
Basic	$ 4.34	$ 2.12	$ 0.07
Diluted	$ 4.24	$ 2.03	$ 0.07
Weighted-average number of shares used in per share calculations:			
Basic	80,178	74,701	56,310
Diluted	82,124	77,971	58,255

SunPower Corporation

Consolidated Statements of Operations
(In thousands, except per share data)

	Year Ended		
	December 28, 2008	**December 30, 2007**	**December 31, 2006**
Revenue:			
Systems	$ 820,632	$ 464,178	$ —
Components	614,287	310,612	236,510
Total revenue	1,434,919	774,790	236,510
Costs and expenses:			
Cost of systems revenue	653,569	386,511	—
Cost of components revenue	417,669	240,475	186,042
Research and development	21,474	13,563	9,684
Sales, general and administrative	173,740	108,256	21,677
Purchased in-process research and development	—	9,575	—
Impairment of acquisition-related intangible assets	—	14,068	—
Total costs and expenses	1,266,452	772,448	217,403
Operating income	168,467	2,342	19,107
Other income (expense):			
Interest income	10,789	13,882	10,086
Interest expense	(4,387)	(5,071)	(1,809)
Other, net	(27,285)	(7,593)	1,077
Other income (expense), net	(20,883)	1,218	9,354
Income before income taxes and equity in earnings of unconsolidated investees	147,584	3,560	28,461
Income tax provision (benefit)	69,368	(5,920)	1,945
Income before equity in earnings of unconsolidated investees	78,216	9,480	26,516
Equity in earnings of unconsolidated investees, net of taxes	14,077	(278)	—
Net income	$ 92,293	$ 9,202	$ 26,516
Net income per share of class A and class B common stock:			
Basic	$ 1.15	$ 0.12	$ 0.40
Diluted	$ 1.09	$ 0.11	$ 0.37
Weighted-average shares:			
Basic	80,522	75,413	65,864
Diluted	84,446	81,227	71,087

FIRST SOLAR, INC. AND SUBSIDIARIES

Consolidated Balance Sheets

	December 27, 2008	December 29, 2007
	(In thousands, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 716,218	$ 404,264
Marketable securities — current	76,042	232,686
Accounts receivable, net	61,703	18,165
Inventories	121,554	40,204
Deferred project costs	710	2,643
Economic development funding receivable	668	35,877
Deferred tax asset, net — current	9,922	3,890
Prepaid expenses and other current assets	90,584	64,780
Total current assets	1,077,401	802,509
Property, plant and equipment, net	842,622	430,104
Deferred tax asset, net — noncurrent	61,325	51,811
Marketable securities — noncurrent	29,559	32,713
Restricted cash and investments	30,059	14,695
Investment in related party	25,000	—
Goodwill	33,829	33,449
Other assets — noncurrent	14,707	6,031
Total assets	$2,114,502	$1,371,312
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 46,251	$ 26,441
Income tax payable	99,938	24,487
Accrued expenses	140,899	76,256
Short-term debt	—	24,473
Current portion of long-term debt	34,951	14,836
Other current liabilities	59,738	14,803
Total current liabilities	381,777	181,296
Accrued collection and recycling liabilities	35,238	13,079
Long-term debt	163,519	68,856
Other liabilities — noncurrent	20,926	10,814
Total liabilities	601,460	274,045
Stockholders' equity:		
Common stock, $0.001 par value per share; 500,000,000 shares authorized; 81,596,810 and 78,575,211 shares issued and outstanding at December 27, 2008 and December 29, 2007, respectively	82	79
Additional paid-in capital	1,176,156	1,079,775
Accumulated earnings	361,225	12,895
Accumulated other comprehensive income (loss)	(24,421)	4,518
Total stockholders' equity	1,513,042	1,097,267
Total liabilities and stockholders' equity	$2,114,502	$1,371,312

SunPower Corporation

Consolidated Balance Sheets
(In thousands, except share and per share data)

	December 28, 2008	December 30, 2007
Assets		
Current assets:		
Cash and cash equivalents	$ 202,331	$ 285,214
Restricted cash, current portion	13,240	—
Short-term investments	17,179	105,453
Accounts receivable, net	194,222	138,250
Costs and estimated earnings in excess of billings	30,326	39,136
Inventories	251,388	148,820
Advances to suppliers, current portion	43,190	52,277
Prepaid expenses and other current assets	96,104	33,110
Total current assets	847,980	802,260
Restricted cash, net of current portion	162,037	67,887
Long-term investments	23,577	29,050
Property, plant and equipment, net	612,687	377,994
Goodwill	196,720	184,684
Intangible assets, net	39,490	50,946
Advances to suppliers, net of current portion	119,420	108,943
Other long-term assets	74,224	31,974
Total assets	$ 2,076,135	$ 1,653,738
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 263,241	$ 124,723
Accrued liabilities	157,049	79,434
Billings in excess of costs and estimated earnings	11,806	69,900
Customer advances, current portion	19,035	9,250
Convertible debt, current portion	—	425,000
Total current liabilities	451,131	708,307
Long-term debt	54,598	—
Convertible debt, net of current portion	423,608	—
Deferred tax liability, net of current portion	8,115	6,213
Customer advances, net of current portion	91,359	60,153
Other long-term liabilities	25,950	14,975
Total liabilities	1,054,761	789,648
Commitments and Contingencies (Note 9)		
Stockholders' Equity:		
Preferred stock, $0.001 par value, 10,042,490 shares authorized; none issued and outstanding	—	—
Common stock, $0.001 par value, 217,500,000 shares of class A common stock authorized; $0.001 par value, 150,000,000 shares and 157,500,000 shares of class B common stock authorized; 44,055,644 and 40,289,719 shares of class A common stock issued; 43,849,566 and 40,176,957 shares of class A common stock outstanding; 42,033,287 and 44,533,287 shares of class B common stock issued and outstanding, at December 28, 2008 and December 30, 2007, respectively	86	85
Additional paid-in capital	1,003,954	883,033
Accumulated other comprehensive income (loss)	(25,611)	5,762
Retained earnings (deficit)	51,602	(22,815)
	1,030,031	866,065
Less: shares of class A common stock held in treasury, at cost; 206,078 and 112,762 shares at December 28, 2008 and December 30, 2007, respectively	(8,657)	(1,975)
Total stockholders' equity	1,021,374	864,090
Total liabilities and stockholders' equity	$ 2,076,135	$ 1,653,738

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