Sol Power: Developing a Global Supply Chain Strategy in a Regulated Growth Market

Written by:

Roy Becker, Julie Lockwood, and Varun Khurana

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1. Introduction

Susan McDougall, Senior Vice President of Supply Chain of Sol Power, pored over the industry reports that she and her team collected before the holiday break. It was early January 2019 and Susan and her team were hard at work developing Sol Power's global supply chain strategy. McDougall has been entrusted with this important task by the company's CEO and she was scheduled to present her recommendations to him and Sol Power's top leadership at the end of the month.

The competitive dynamics have shifted in the solar power industry. While technological innovation and manufacturing advances remain as two key sources of competitive advantage, solar power companies that are able to optimize their global supply chain will be best positioned to exploit new opportunities and emerge as leaders in the industry.

McDougall's mandate was to develop a global supply chain strategy that will support Sol Power's overall goal of improving profit margins by three percentage points by 2020. To achieve this, McDougall knew that her proposed strategy would have to address multiple and interrelated priorities, including (1) reduce supply, transportation, and distribution costs, as well as promote better customer service, in the US market, (2) address supply chain management issues brought on by the company's expansion into China, India, and the United Kingdom, and (3) Identify inventory and/or materials management concepts that will best support Sol Power.

2. Background on Sol Power[1]

Headquartered in Silicon Valley, Sol Power is a designer and manufacturer of solar panels for homes and businesses. The company has a strong history of innovation and has led the industry with over 750 patents in solar technology. Sol Power has been manufacturing the world's highest efficiency panels with a strong track-record for reliability and long-lasting solar panels. The company's 2017 revenue was US $2.5 Billion with a profit margin of 11.9%. It trades on the US NASDAQ.

Currently Sol Power has state-of-the-art manufacturing centers in Mexico, France, China and the Philippines. The company's current manufacturing strategy is to design, build and manufacture for the Americas market in Mexico. They then ship to a distribution center (DC) in Texas for inventory holding until customer orders are received. The variability in demand (due to regulations) in the United States market has recently caused a back-log in inventory in the Texas distribution center.

[1] Sol Power is a fictitious company.

Due to the local and regional product configurations; Sol Power must fulfill orders out of a manufacturing facility that supports that regions. Therefore, the facility in France manufactures for the European marketplace. Demand in the European continent and the United Kingdom has been steady and predictable. The Chinese manufacturing facility services the company's markets in China and Hong Kong where demand has been very strong. While Sol Power's Philippines manufacturing facility services all demand in Asia-Pacific; the Asia-Pac team has partnered with a distributor who facilities in-country inventory management, transportation and installations in the region. This type of global inventory management helps meet customer demand and minimize costly manufacturing configurations in each geographic manufacturing facility. However, having 4 manufacturing plants can cause increased global inventory that cannot be shared between marketplaces.

Today, Sol Power manufacturers all of its own crystals as inputs for the solar manufacturing process to ensure the reliability of supply and quality of components. Susan's team has worked with the engineering team to analyze outsourcing the manufacturing of the crystals to a 3rd party. While this would reduce costs, her team was unwilling to recommend it due to the loss of control of a key part of the manufacturing process.

Sol Power has historically sourced 90% of their wafers from China and Taiwan, which has led to higher in-bound transportation costs for the Americas manufacturing facility.

Sol Power contracts transportation with providers via ground, air, ocean and integration services for final mile delivery. Their goal is to use ground transportation where-ever possible. However, air freight is sometimes used for urgent shipments of parts between manufacturing centers.

Integrators form a strong network with their business because they interact with the customer for final installation. The mix of Sol Power's customers ordering solar panels are constantly changing. Currently, 80% of the company's end customers are residential and 20% are businesses.

The Solar Power Industry

History of the Solar Power Industry:

The first solar power motor was invented in 1904 by HE Willsie and John Boyle. While solar technology has been available for more than 100 years, it was during the past decade that demand has picked up. The industry emerged from solar panels utilized in NASA's space program followed by off-grid industrial needs in energy and communications. Meaningful residential and commercial growth began in 2006 with the launch of California's million solar roofs initiative.

Industry Size and Growth:

Since 2007, the US solar industry has experienced a cycle of booming growth and then softening in fits and starts. Although the power grid can support solar in every state, permitting, regulatory constraints and lengthy payback periods have initially hampered growth at the residential and commercial levels. However, solar power installations have picked up in recent years, doubling in 2016 over 2015, as more and more regions of the United States began pulling their power from the sun. As of the fourth quarter of 2018, there have been 1.3 million solar installations across the United States.

Trends:

In past years industry growth and gains have been supported by improving the photovoltaic technology through engineering and design. For example, Sol Power is heralded for its impressive conversion efficiency, holding the world record multiple times over the last 10 years. Conversion efficiency yields higher system output which aids in driving down the cost of power, enabling more customers to justify procuring solar energy. Additionally, the industry and Sol Power have been able to lower costs through technological advancement in racking and reducing the costs of the transformers. The cost to install a solar power system is roughly 25%-30% of the total costs of the system.

Solar power in the United States breaks down into two major applications: 1) utility-scale solar power that delivers power over the transmission grid and 2) local distributed generation, mostly from rooftop photovoltaics which deliver power directly to the facilities and households. From May 2017 to May 2018. distributed solar photovoltaic generation was estimated to be 2.09% of total U.S. electricity. In terms of total cumulative installed capacity by 2017, the United States ranked 2nd in the world behind China in total cumulative installed capacity.

The industry has experienced rapidly decreasing photovoltaic prices over the last 10 years which have made the adoption and business case around solar attractive to many consumers in all geographic markets. Significant cost reductions were achieved from 2012-2017 through labor, assembly and production efficiencies created by increased manufacturing scale in Asia, primarily in China.

This labor efficiency is impacted by a recent tariff of 30% which started in February 2018. This tariff will decline each year until it reaches 15% in 2022 and then goes away in 2023.

Regulatory Environment:

Regulatory and construction policy has had a large impact on the Solar Panel industry. Each country, state and even city or province have its own regulations regarding the homeowner's incentives, net metering and building ordinances. This complex regulatory landscape coupled with outdated utility practices has forced the industry to crawl in some areas.

In the United States, there are national and local (even utility specific) regulations that have kept the industry from moving forward. Many plug and play solar solutions being used in other countries are prohibited in the United States. These intricate web of rules in the U.S. make investing in solar a time consuming endeavor.

In China the centralized National Energy Administration (NEA) sets annual targets for installed solar capacity. At the local level development commissions are responsible for approving projects and defining subsidies. The Chinese government is actively stimulating domestic demand.

The United Kingdom is similar to the United States in the incentives and refunds that have been provided to consumers wanting to install solar panels. Despite many cloudy days customers have fully embraced the shift to non-fossil fuel energy.

Overall the regulatory environment is unpredictable so solar companies that understand the trend will perform better in forecasting and predicting client needs.

Competition:

Currently, SolPower faces competition in the international market from big solar players in the UK, China and India, as follows:

United Kingdom	China	India
Solarcentury	Suntech Solar	Adani Power Ltd.
Evo Energy	JinkoSolar	Tata Power Solar Systems Ltd.
Spirit Energy	Trina Solar	EMMVEE
Project Solar UK Ltd	JA Solar	Icomm Tele Ltd.
	Yingli Solar	
	Canadian Solar	

As noted earlier, the US imposed 30% tariffs on imported solar cells and solar equipment produced in China. This tariff changes the dynamic for US solar installation companies by increasing the cost of solar products coming from overseas while potentially making solar panels produced in the US more cost competitive at least in the short term. While this local tariff protection may aid in increased US Market growth, Sol Power needs to balance this short-term opportunity with its goal of expanding internationally.

Similarly, India has the world's 6th largest solar power park located in state of Tamil Nadu with over 2.5 Million solar panels. India has decided the country would like to adopt and support solar power and therefore has incentivized companies for production in the country of India.

Raw Materials and Manufacturing:

There are many factors at play in the worldview of raw materials and manufacturing of Photovoltaic products and components. Producing Photovoltaic is a complex and capital-intensive process. Quality is crucial. The initial investments in this industry back in 2010 were centered around thought leadership centers; mainly university research centers in Germany and the United States.

Crystal growing sites are best suited where there are reliable and lower costs energy due to the high demand during the production process and high temperatures required.

A silicon crystal must change shape several times before it winds up as the precisely calibrated wafers that form the foundations of photovoltaic cells. It is generally accepted that there are 8 major inputs into the Solar Panel manufacturing process that produces a Solar Module; these include: Polysilicon, Ingots, Silicon Wafers, Solar Cells, Backsheets, Junction Boxes, Solar Frames, and Solar Glass. These inputs are sourced from various raw material suppliers throughout the world.

In the production of wafers, it is tough to compete with China and Taiwan; 68% of the worlds wafer production is done in China and Taiwan with 100% done in Asia. Wafer transportation is relatively inexpensive. Therefore, the tug-of-war between locating manufacturing close to end customers versus cheap labor continues to drive the industry.

As the solar industry has grown and manufacturing costs have decreased, there has been consolidation in the industry. Vertical integration throughout raw material and manufacturing process has led to cost reduction and better competitive advantage for the players. Many solar companies have hired integrators to support the installation process; this horizontally integrated

company works directly with the manufacturer to complete the activities from port to installation at the residential or business site. The integrators are experts at transporting the solar panels through the final mile and installing them at the customer locations. This installation process can cost roughly 30% of a total price of the solar system. Again, quality of the installation is important to receive the payback estimated.

Conclusion

Susan is working with her team to develop their key supply chain recommendations and prepare for presentation to the company's CEO. She knows that a reduction in supply chain costs relies on working with the engineer and manufacturing teams to adjust any strategies that lead to better utilization of worldwide manufacturing sites and reduced logistics costs. Think through the opportunities and problems Susan will face.

Susan and her team will support the expanding marketplace, China, India and the UK, with the first class distribution and an integrator that understands the final mile services needed.

If your team was Susan, please discuss your recommendations in your presentation. Use your knowledge of Business, Supply Chain, outside research and professor assistance to prepare the presentation to be delivered to the CEO (judges at the Operations Stimulus Event). You will have 25 minutes to present and 5-10 minutes of questions.

Good Luck!

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