

UNIVERSITY OF CENTRAL FLORIDA
PV Manufacturing Data Base and Florida Applications

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Description: The overall goal of this project is to assist in the stimulation of the development of a photovoltaic (PV) manufacturing industry in Florida. The project objective is to conduct a review of the national and international PV manufacturing data for the purposes of establishing industry practices and an industry data base. The data base will then be available to assist Florida in establishing PV manufacturing firm(s).

Budget: \$81,120

Universities: UCF/FSEC

Progress Summary

This project's goal to establish a PV manufacturing database has approached the database by separating the PV manufacturing information into three areas – world-wide statistics, U. S. statistics and Florida activities. The database was established in 2008, was updated for 2009 and some statistics are available for 2010.

World-wide Statistics

At this time, the world-wide statistics data for 2010 has yet to be published. The present results for world-wide production for 2008 and 2009 in megawatts (Mw) are as follows:

	2008	2009	08-09 change	2009 Market share
China	1848.4	3946	113.5%	37.0%
Europe	1906.6	1930	1.2%	18.1%
Japan	1224	1508	23.2%	14.1%
Taiwan	853.9	1245	45.8%	11.7%
U.S.	412	595	44.4%	5.6%
<i>ROW</i>	<i>696.2</i>	<i>1436</i>	<i>106.3%</i>	<i>13.5%</i>
Total	6941.1	10660	53.6%	100.0%

Notes:

- PV production increased by 53.6% from 2008 to 2009.
- China leads production at 3946 Mw with 37% market share.
- U. S. production is 595 Mw showing a 44.4% increase from the previous year.
- U. S. market share for 2009 was 5.6% and preliminary figures for 2010 show the U. S. market share remains about the same.

U. S. Statistics

U. S. installations per year by state (includes data for 2010) are as follows:

State	2008	2009	2010	09-10 Change	2010 Market Share
CA	178.7	212.1	258.9	22.1%	29.5%
NJ	22.5	57.3	137.1	139.3%	15.6%
NV	14.9	3	61.4	1946.7%	7.0%
AR	6.4	21.1	54	155.9%	6.1%
CO	21.7	23.4	53.6	129.1%	6.1%
PA	--	3	46.8	1460.0%	5.3%
NM	--	1	42.8	4180.0%	4.9%
FL	0.5	35.7	35.2	-1.4%	4.0%
NC	4	7.8	30.7	293.6%	3.5%
TX	--	4	22.6	465.0%	2.6%
Others	38.6	34.7	135.2	289.6%	15.4%
Total	287.3	403.1	878.3	117.9%	100.0%

Notes:

- California remains number one at 258.9 Mw or 29.6% of total.
- Florida is ranked 8th with a large increase in 2009 because of FPL
- Florida remains close to its 2009 number with 35.2 Mw installed in 2010.
- U. S. installed capacity in 2010 more than doubled from 2009 with a 118% increase.
- Sixteen states now have over 10 Mw installed capacity in 2010, up from four states in 2008.
- Utility installations showed the major increase for 2010 going from 113 Mw to 242 Mw. Reference 1 has also noted that over 700 Mw of utility PV is already contracted for 2011.

U. S. based PV manufacturers for 2008 and 2009 are as follows:

Company	State	2008	2009
First Solar	AZ	147	147
United Solar	MI	113	120
Evergreen Solar	MA	26.5	104.6
Solarworld	CA	61	71.8
Solyndra	CA		30
BP Solar	MD	27.7	
Schott Solar	NM	11	
Global Solar	AZ	7.2	
Other		18.7	121.6
Totals		412.1	595

Notes:

- First Solar is the world's largest PV producer with a total of 1011 Mw.
- No other U.S. manufacturer is in the top 15.

From Reference 1, the following comments were made with respect to PV manufacturers in the U. S.

The highly impressive top-line results, however, mask continuing turbulence in the field of domestic PV manufacturing. Manufacturing is a global industry, and competition from producers in low-cost regions such as China and Taiwan has introduced significant challenges for manufacturers in the U. S., Europe, and Japan over the past eighteen months. As a consequence, 2010 saw closure announcements at no fewer than three domestic PV manufacturing facilities: BP Solar's wafer-cell plant in Maryland, Spectrawatt's just-opened cell plant in New York, and Evergreen Solar's integrated 160 MW wafer-cell-module plant in Massachusetts. Cost pressure on domestic plants is



expected to continue to be an issue through 2011, meaning that additional plant closures will not come as a surprise. At the same time, however, 2011 should also see new plants being built, notably Wacker Chemie AG's polysilicon plant in Tennessee, Flextronics' crystalline silicon module plant in California, and Stion's CIGS (Copper Indium Gallium Selenide) facility in Mississippi.

Of the more than 2,000 companies in the U. S. solar value chain, there are at least 39 active facilities manufacturing PV components (polysilicon, wafers, cells, modules, inverters) spread across 17 states in the U. S. A great many of these are located in California due to its leadership position as an end-market, as well as the adjacent states of Oregon and Arizona, which offer skilled labor and strong policy support for PV manufacturers. While the Midwest has historically been dormant on the PV manufacturing front, recent plant announcements in Wisconsin, Indiana, and Illinois suggest that this is changing quickly. The geographic shift towards the Midwest seems to be taking place at the expense of states on the Eastern seaboard such as Massachusetts, Maryland, New York, and New Jersey, which have seen a total of five plant closures since mid-2009.

On April 8, 2011 and on the positive side, General Electric announced that it will build the largest PV manufacturing plant in the U.S. The plant size is 400 Mw and is budgeted at \$600 million. The plant locations are said to be in NY, CO or SC.

In addition, Reference 1 presents information on PV costs. The data is presented by market type and the average is as follows:

National weighted-average systems prices fell by 20.5% over the course of 2010, from \$6.45/W to \$5.13/W. Much of this decline was due to a shift toward larger systems, particularly utility systems.

PV Manufacturers in Florida

- Advanced Solar Photonics (ASP), Lake Mary, FL, is a manufacturer and R&D center for monocrystalline solar panels and racking systems for residential, commercial, and utility applications. ASP focus is high power solar modules ranging from 190 watts to 400 watts. Associated with ASP is BlueChip Energy, LLC (BCE) a fully-integrated solar PV power generator, occupying all segments of the solar power value chain, from manufacturing of solar panels and balance of systems components, to the sale of turnkey solar power plants – and solar electricity — to residential, commercial, and industrial customers.
- On March 7, 2011, BlueChip Energy™ (BCE), announced that it has signed an agreement to acquire land in central Florida for the development of the third largest US PV installation, a 40 megawatt (MW) capacity solar farm called Sorrento Solar Farm. The solar farm will be a ground-mount system covering 140 acres of open field in Lake County, Florida. The proposed site is located 50 miles northwest of Orlando adjacent to two utility substations.
- Mustang Vacuum Systems, LLC, of Sarasota County, FL is a company that has received \$577,636 from the Florida Renewable Energy Grants Program in May 2009. The company offers tools and technology for producing PV. It is not a PV manufacturing company.
- In 2008, Blue Sky Solar, Inc. made preliminary comments concerning the location of a PV manufacturing plant in Orlando. It has a website at www.blueskysolar.com which states that Blue Sky Solar is a U.S. based manufacturer of large utility-sized solar modules, but no location is given and the website appears to be out-dated.
- Willary & Kelsey Solar Group, an Ohio company, was coming to Florida, but due to incentives changed its mind and stayed in Ohio.

References

Solar Energy Industries Association. (2010). U. S. Solar Market Insight – 2010 Year in Review: Executive Summary.

