

### SEIA/GTM RESEARCH QUARTERLY SURVEY RESULTS; PENNSYLVANIA MAKES A BIG LEAP IN THE US PV MARKET

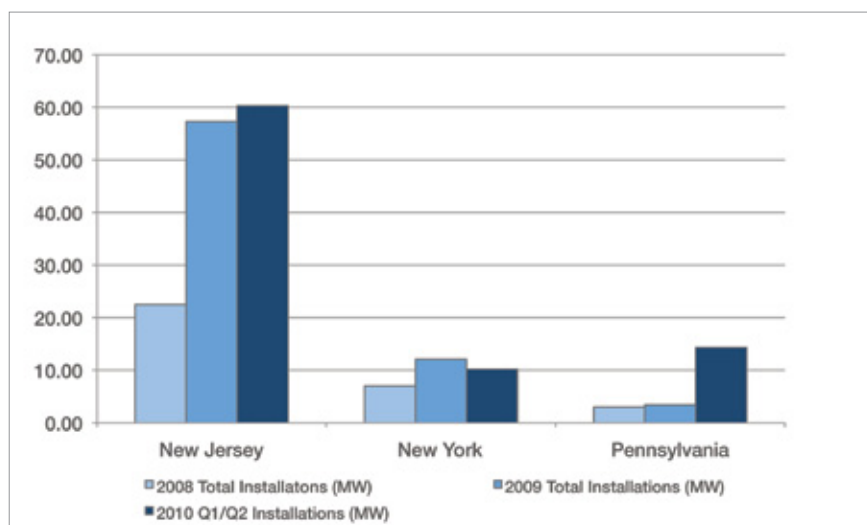
**Until this year, Pennsylvania has lagged behind its neighbors, New York and New Jersey, in total solar PV installations.**

In the first half of 2010, however, Pennsylvania has more than doubled its combined 2008 and 2009 installed capacities and has even inched ahead of New York. The reason New Jersey's solar market has consistently been one of the strongest in the country can be attributed to its State Renewable Energy Credit (SREC) market. Pennsylvania has a similar system in place, though it is less well defined. With solar requirements ramping up in the near future, and considering

the size of the state, Pennsylvania is poised to become one of the largest markets in the region.

The SREC program in Pennsylvania is still in the early stages of development, but the state's Alternative Energy Portfolio Standard (AEPS) requires an increasing amount of the energy sold to customers come from renewable sources. In order for energy retailers (namely PPL and PECO, which control over 50% of the market) to adhere to

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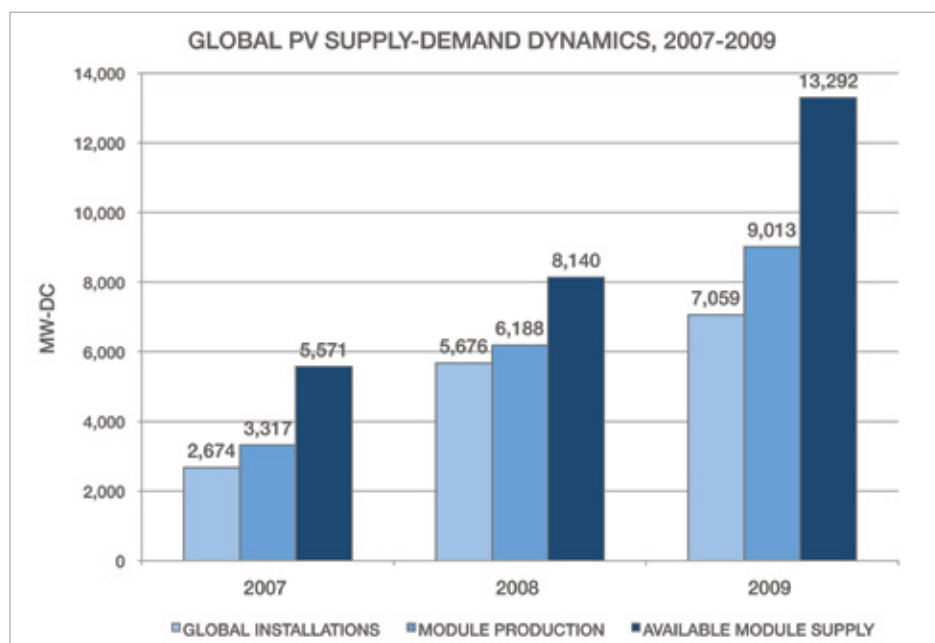
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## CRYSTALLINE SILICON PV - LOOKING FORWARD TO 2011

AN EXCERPT FROM THE NEW GTM RESEARCH REPORT 'PV PRODUCTION, TECHNOLOGY, AND COST FORECAST'  
BY SHYAM MEHTA

On the surface, 2009 was also another record-breaking year for the industry, with over 7 GW of modules installed, total module production of 8.95 GW, and cell production of 10.66 GW – a 51% increase over 2008 cell production of 7.05 GW (itself an 88% increase over 2007). Still, as shown in Figure 1, growth in supply easily exceeded that in demand on the whole. Installations increased by only 24% last year after growing at close to 50% for the better part of last decade, while capacity expansions that were set into place in 2008 resulted in available module supply in 2009 being almost twice that of demand. However, as discussed below, a large percentage of this capacity was not bankable, which helped to insulate the rest of the market from a prolonged period of overcapacity.

FIGURE 1: GLOBAL PV SUPPLY VS. DEMAND, 2007-2009



The high-level results in Figure 1 mask the fact that 2009 was one of the most challenging years for PV suppliers in recent memory. The credit crisis, the global recession, the evaporation of demand in Spain (the largest PV market in 2008), and a harsh German winter led to a severe slump in installations in late 2008 and early 2009, and the consequent overcapacity and inventory build led to sharp price declines all across the value chain. However, the situation took a turn for the better in the second half of 2009, as the German market rebounded strongly, aided by looming policy uncertainty in

2010 and the return of project financing in the second half of 2009. As a result of being forced to idle most of their capacity at the beginning of the year, top-tier manufacturers found themselves sold out in the last quarter of the year, during which an unprecedented 2.4 GW was installed in Germany alone. With project economics still working in their favor and established low-cost players (First Solar, Suntech, Yingli, Trina) being capacity constrained, even high-cost manufacturers saw strong demand.

The robust demand environment (fueled primarily by the German market) has continued well into 2010 thus far. As shown in Figure 2, eight cell producers alone shipped over 1.9 GW in the Q2 2010 -- three times what was shipped in Q1 2009. Most bankable producers are sold out for the rest of the year, and consequently, prices, which had been in free-fall for much of 2009, have stabilized across the value chain, actually experiencing a 5% to 10% increase in the second and third quarters of 2010.

Deployment and Demonstration). The CSI aims to create 1,940 megawatts of new, solar-produced electricity by 2016 with a budget of \$2.2 billion over 10 years.

[www.sunpowercorp.com](http://www.sunpowercorp.com)  
[www.ice-energy.com](http://www.ice-energy.com)  
[www.xtremepowerinc.com](http://www.xtremepowerinc.com)  
[www.zbbenergy.com](http://www.zbbenergy.com)

### **Petra Solar Wins Prestigious SEGIS Contract**

Sandia National Laboratories has awarded Petra Solar its prestigious Solar Energy Grid Integration Systems (SEGIS) contract as part of the U.S. Department of Energy Solar Energy Technologies Program. Petra has now won a total of \$5.8 million worth of federal grants. Through the contract, Petra Solar will extend its development of electric grid stabilization, micro-grid and smart grid technologies, which will enable utilities to manage the massive increase in renewable energy deployment expected as the renewable energy markets grow.



Source: Petra Solar

The state of New Jersey plans to install more than 200,000 modules from Petra on existing utility poles and tie them into the grid. These line voltage inverters have advanced smart grid and communication capabilities.

Petra Solar won the SEGIS Stage 3 contract, which is designed to help the winning company push its products toward commercialization.

The contract – worth about \$3 million – was awarded in a competitive process that drew a number of prominent industry names. Petra Solar's research has focused on three issues: enabling utilities to better monitor and control solar electricity as it becomes part of the mix of electricity sources, helping utilities prevent grid instability that can result from the high penetration of solar into the grid, and creating technological tools to allow the electricity system to accept and use solar and other cleantech resources more broadly among its energy sources.

[www.petrasolar.com](http://www.petrasolar.com)

## **EUROPEAN NEWS**

### **Sulfurcell Unveils CIGS Cell With 10.7% Efficiency**

[www.sulfurcell.com](http://www.sulfurcell.com)

At PVSEC, Sulfurcell Solartechnik unveiled prototypes for its new product line, which consists of 1.25m by 0.65m modules with a considerably increased efficiency of 10.7% and a peak output of 86.8 watts.

After an intensive development phase lasting just four months, in July of this year Sulfurcell succeeded in producing the first prototypes of large-format CIGS solar modules with efficiencies greater than 10%. This represents a milestone for the highly specialized experts in Sulfurcell's research department, since very few manufacturers of thin-film solar modules are currently capable of producing high quality modules with efficiencies in the double digits.

Scientists have already been able to produce CIGS solar cells with efficiencies greater than 20% under laboratory conditions. In order to exploit this potential, Sulfurcell's CIGS process deploys co-evaporation techniques. The manner in which these are utilized to manufacture the record-breaking cells depends, however, on proprietary design features and components. A major advantage of this process is that the CIGS layer properties can be precisely configured, which enables the material's potential to be exploited to the fullest extent. The company's medium-term technology roadmap is clearly defined: Sulfurcell is already aiming to surpass the 11% threshold in 2011 and the 12% threshold in 2012. Module efficiencies exceeding 14% are realistic by 2015.

### **Oerlikon Continues Driving Amorphous Silicon**

Oerlikon Solar remains committed to amorphous silicon (a-Si) solar technology and, to that end, is promising improved efficiency trends and improved cost numbers. Oerlikon clearly believes there's a future for the oft-pilloried a-Si photovoltaic technology and the firm continues to make aggressive cost and performance claims.

At PVSEC, Oerlikon unveiled new technology that looks to drive down cost and increase efficiency in its thin-film solar production lines. The rechristened "ThinFab" includes a number of changes to the equipment and process:

# PV NEWS FEED-IN TARIFF TRACKER

## EUROPEAN FEED-IN TARIFF TRACKER

COUNTRY	SYSTEM TYPE	KWP/LOCATION	2009	2010			2011 DIGRESSION	2011		
Germany	Jan 1 - Jun 1    Jul 1 - Oct 1    Oct 1 - Dec 31									
	Ground Mount	<30	€ 0.32	€ 0.28	€ 0.24 - 0.25	€ 0.24	9%*	€ 0.21 - 0.23		
		30-100	€ 0.32	€ 0.28	€ 0.24 - 0.25	€ 0.24	9%*	€ 0.21 - 0.23		
		100-1000	€ 0.32	€ 0.28	€ 0.24 - 0.25	€ 0.24	9%*	€ 0.21 - 0.23		
		>1000	€ 0.32	€ 0.28	€ 0.24 - 0.25	€ 0.24	9%*	€ 0.21 - 0.23		
	Rooftop	<30	€ 0.43	€ 0.39	€ 0.34	€ 0.33	9%*	€ 0.30		
		30-100	€ 0.41	€ 0.37	€ 0.32	€ 0.31	9%*	€ 0.29		
		100-1000	€ 0.40	€ 0.35	€ 0.31	€ 0.30	9%*	€ 0.27		
		>1000	€ 0.33	€ 0.29	€ 0.26	€ 0.25	9%*	€ 0.23		
Spain	Ground Mount		€ 0.28	€ 0.32			45.0%	€ 0.176		
	Rooftop	<20	€ 0.34	€ 0.34			5.0%	€ 0.323		
		>20	€ 0.31	€ 0.31			25.0%	€ 0.233		
Italy	Jan - Apr    May - Aug    Sept - Dec									
	Ground Based; Classified as 'Other Systems' for 2011	1 to 3	€ 0.39	€ 0.38			12.3%*	€ 0.362	€ 0.347	€ 0.333
		3 to 20	€ 0.37	€ 0.37			17.8%*	€ 0.339	€ 0.322	€ 0.304
		> 20 (20 - 200 for 2011)	€ 0.35	€ 0.34			16.2%*	€ 0.321	€ 0.309	€ 0.285
		200 to 1000					21.8%*	€ 0.314	€ 0.303	€ 0.266
		1000 to 5000					22.4%*	€ 0.313	€ 0.289	€ 0.264
		>5000					26.2%*	€ 0.297	€ 0.275	€ 0.251
		Rooftop	1 to 3	€ 0.39	€ 0.38			0%*	€ 0.402	€ 0.391
	3 to 20		€ 0.37	€ 0.36			5%*	€ 0.377	€ 0.360	€ 0.342
	> 20 (20 - 200 for 2011)		€ 0.35	€ 0.34			5%*	€ 0.358	€ 0.341	€ 0.323
	200 to 1000						7.7%*	€ 0.355	€ 0.335	€ 0.314
	1000 to 5000						11.2%*	€ 0.351	€ 0.327	€ 0.302
	>5000						15.6%*	€ 0.333	€ 0.311	€ 0.287
	BIPV	1 to 3	€ 0.48	€ 0.47			6.4%	1kW to 20kW	€ 0.44	
		1 to 3 (partially integrated)	€ 0.43							
		3 to 20	€ 0.45	€ 0.44			9.1%	20kW to 200kW	€ 0.40	
		3 to 20 (partially integrated)	€ 0.41							
		>20	€ 0.43	€ 0.42			11.9%	> 200kW	€ 0.37	
		>20 (partially integrated)	€ 0.39							
France	Roof-integrated			Pre 9/1	Post 9/1					
		Residential <3		€ 0.58	€ 0.58		TBD			
		Residential >3		€ 0.58	€ 0.51		TBD			
		Schools and hospitals		€ 0.58	€ 0.51		TBD			
		Other	€ 0.60	€ 0.50	€ 0.44		TBD			
	Non-integrated roof			€ 0.42	€ 0.37		TBD			
	Ground Mount	Northern France		€ 0.38	€ 0.33		TBD			
		Southern France		€ 0.31	€ 0.27		TBD			
		Overseas	€ 0.42	€ 0.40	€ 0.35		TBD			