

# 2012 U.S. SOLAR MARKET INSIGHT & INVESTMENT OPPORTUNITIES



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# A Historic and Busy Year for the U.S. Solar market

- 2012 was a historic and busy year for the U.S. solar market. Photovoltaic (PV) installations grew **76%** over 2011, to total **3,313 megawatts (MW)** in 2012, with an estimated market value of **\$11.5 billion**.
- Each market segment (residential, non-residential, and utility) showed growth over 2011.
- Installed prices for PV systems fell **27%** during 2012 and at least 13% in each market segment.
- Nearly 83,000 homes installed solar PV, and cumulative PV installations in the U.S. surpassed 300,000.



# Four Trends & Events

- Trade Dispute Resolution (貿易紛爭解決)
- Ongoing Manufacturing Consolidation (製造端持續整合)
- The Third-Party-Owned (TPO) Residential Solar Revolution (第三方產權住宅太陽光電系統革命)
- Mega-Scale Solar Coming to Fruition (Mega 級太陽能電廠效益浮現)
- Diversification in project financing (多元的計畫融資方案)



# Trade Dispute Resolution

(貿易紛爭解決)

- The U.S. government concluded its investigation of Chinese PV cell imports to the U.S., which resulted in the creation of tariffs on these cells.
- Although the ultimate impact of this decision is difficult to gauge, Chinese module shipments to the U.S. decreased significantly.
- **PV prices, however, continued to fall.** Meanwhile, global trade tensions continue and ongoing investigations in Europe and China could result in new tariffs.

# Ongoing Manufacturing Consolidation

(製造端持續整合)

- PV manufacturers saw little relief from global oversupply in 2012 as manufacturer margins remained depressed and less-competitive facilities were shuttered around the world.

# The Third-Party-Owned (TPO) Residential Solar Revolution

(第三方產權住宅太陽光電系統革命)

- Residential solar leases and power purchase agreements (PPAs) continued to gain popularity throughout 2012.
- Third-party-owned systems accounted for **over 50%** of all new residential installations in most major residential markets, with Arizona topping 90%.
- New vendors entered the space to provide unique twists on the business model or offer ancillary services such as customer lead generation.
- Research forecasts that the third-party-owned residential solar market will maintain its momentum and become a **\$5.7 billion** market by 2016.



# Mega-Scale Solar Coming to Fruition

(Mega 級太陽能計畫展現成果)

- After years of announcements and preliminary milestones, the first wave of truly utility-scale solar came on-line in 2012.
- **Eight of the ten** largest PV projects operating today were completed in 2012, some of which were recipients of the DOE Loan Guarantee program.
- This trend should continue in 2013, with more than **4,000 MW** of utility solar projects currently under construction and more than **8,000 MW of projects with PPAs** in place and yet to begin construction.



# Diversification in Project Financing

(多元的計畫融資方案)

- Market participants have laid the groundwork for a variety of new ways to finance solar projects.
- Some of these have been introduced already and now need to scale, while others will become a reality for the first time this year.
- Examples of such structures include solar Real Estate Investment Trusts (REITs), crowdfunded solar projects, securitized solar assets, and solar inclusion in Master Limited Partnerships (MLPs).





# 2012 Key Findings -1

- Annual U.S. PV installations grew 76% in 2012 to reach 3,313 MW.
- The U.S. accounted for 11% of all global PV installations in 2012, its highest market share in at least fifteen years.
- Cumulative PV capacity operating in the U.S. as of the end of 2012 stood at 7,221 MW.
- Eight of the ten largest PV projects currently in operation in the U.S. were completed in 2012.
- Eleven states installed over 50 MW each in 2012, up from eight in 2011.

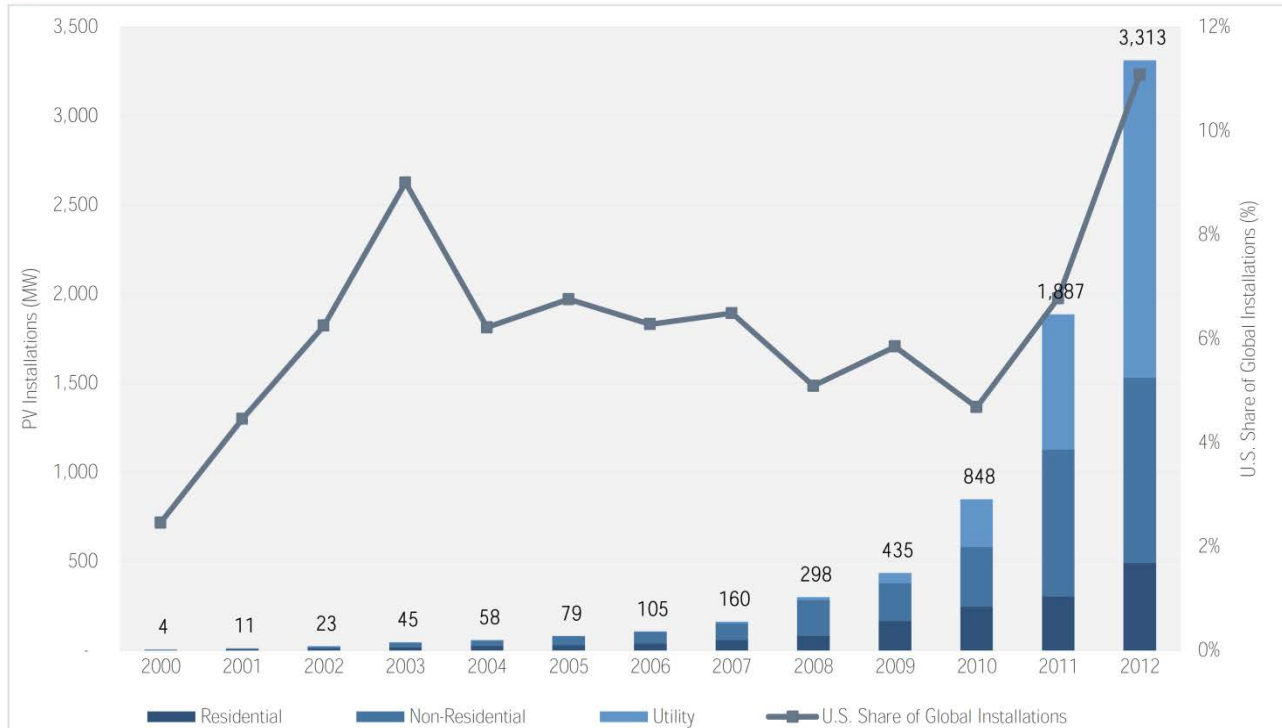


## 2012 Key Findings -2

- There were over 90,000 PV installations in 2012 in the U.S., including 83,000 in the residential market alone.
- The blended average sales price for PV modules for Q4 2012 was \$0.68/W, a staggering 41% below the Q4 2011 price of \$1.15/W.
- Weighted average U.S. PV system prices fell 27% in 2012, to \$5.04/W in the residential market, \$4.27/W in the non-residential market, and \$2.27/W in the utility market by the end of 2012.
- Research forecasts the U.S. market to grow 30% in 2013 with 4.3 GW of new PV installations anticipated across all market segments

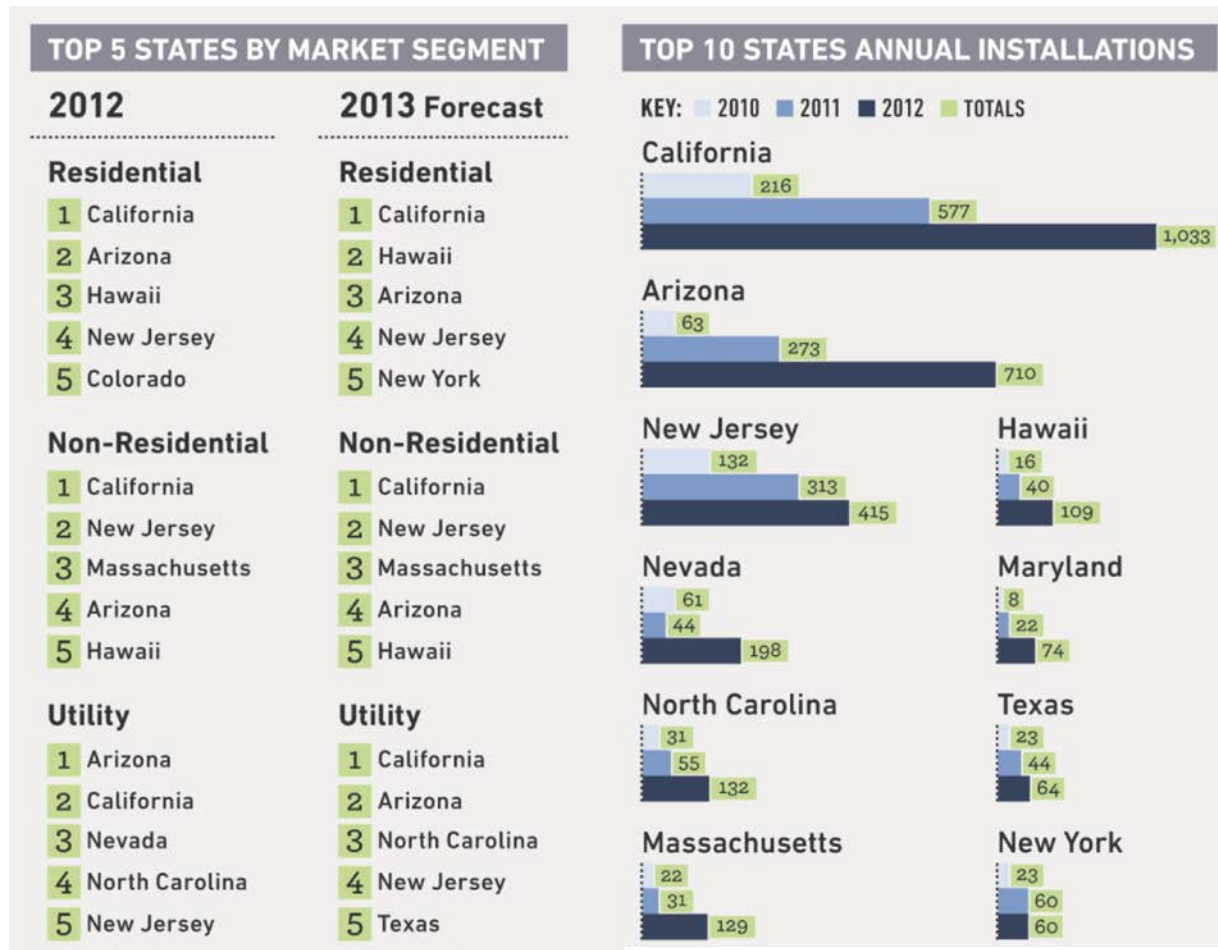


# U.S. PV Installation and Global Market Share, 2000-2012



Installations (MWdc)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential	1	5	11	15	24	27	38	58	82	164	246	302	488
Non-Residential	2	3	9	27	32	51	67	93	200	213	336	826	1,043
Utility	0	3	2	3	2	1	0	9	16	58	267	760	1,781
<b>Total Installations</b>	<b>4</b>	<b>11</b>	<b>23</b>	<b>45</b>	<b>58</b>	<b>79</b>	<b>105</b>	<b>160</b>	<b>298</b>	<b>435</b>	<b>848</b>	<b>1,887</b>	<b>3,313</b>

# Top 5 States by Market Segment & Top 10 States Annual Installations



# Installed Capacity by Segment

## Residential

- 144 MW installed in Q4 2012, representing 13% quarterly growth over Q3 2012
- 488 MW installed in 2012, representing 62% annual growth over 2011

## Non-Residential

- 282 MW installed in Q4 2012, representing 13% quarterly growth over Q3 2012
- 1,043 MW installed in 2012, representing 26% annual growth over 2011

## Utility

- 1,782 MW installed in 2012 from 152 projects, up 134% over 2011
- Project pipeline with PPAs in place stands at 10.5 GW, of which 3.1 GW are currently in construction

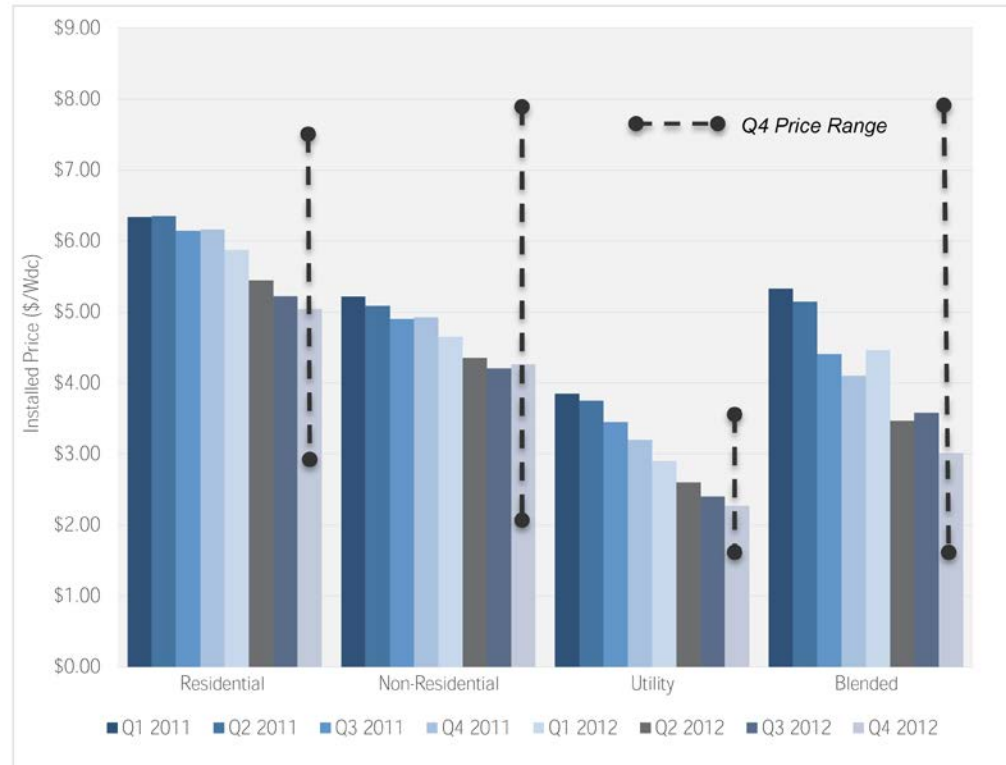


# Installed Prices by Segment

- From Q4 2011 to Q4 2012, **Residential system** prices fell 18.1% percent, from \$6.16/W to **\$5.04/W**.
- **Non-residential system** prices fell 13.3% percent year-over-year, from \$4.65/W to **\$4.27/W**.
- **Utility system** prices once again declined quarter-over-quarter and year-over-year, down from \$3.20/W in Q4 2011 and \$2.40/W in Q3 2012 to settle at **\$2.27/W** at the end of 2012.

# Average Installed Price by Market Segment

Figure 2.6 Average Installed Price by Market Segment, 2011-2012



# Component Pricing





# 2013 Market Forecasts

- **Consistent, albeit more moderate, market growth:** Our forecast calls for a 28% compound annual growth rate (CAGR) for the 2013-2016 period, down from 82% for the 2009-2012 period but more sustainable in the longer term.
- **The new rise of distributed generation:** Whereas the past few years could be described as the rise of utility PV, we anticipate a resurgence in distributed generation in the coming years.
- **2016 installation boom:** Assuming the ITC is not extended past its current expiration date of December 31, 2016, the final year of the ITC will be a banner year for the U.S. solar market as developers rush to complete projects.



# To Join the Taiwanese Delegation to Attend the 2012 Inter Solar North America Exhibition & Conference

**Date:** July 9-11

**Co-Organizers:** AIT, TPVIA, SEMI, ITRI

**In Conjunction Events:**

- July 10, US-Taiwan Industry Cooperation Forum with one-on-one business meeting opportunities with US companies
- July 12, Outreach events to visit utility scale solar power plants, one under operation and one under construction

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