NEW FROM IC INSIGHTS: THE SEMICONDUCTOR INDUSTRY'S MOST RESPECTED MARKET RESEARCH FIRM

SPECIAL 2009 STUDY

Solar Energy
Growth Opportunities for the Semiconductor Industry

- Unique report focused on solar industry's relationship to semiconductor industry
- Executive summary of photovoltaic technology in its many forms
- Production and pricing forecast for solar PV devices through 2013
- Common base—Silicon wafers are still used for almost 90% of PV production
- Opportunities for semiconductor industry's materials, equipment, and chip suppliers

MAJOR FINDINGS INCLUDE:

1. 2009 to be a year of significant changes as PV industry enters adolescence with recession that spurs consolidation, elimination of weaker players, and market contraction following several years of strong growth.
2. Reversal to a buyer's market for polysilicon in 2009 will boost mainstream wafer-based PV technologies vs. thin-film and compound semiconductor competition.
3. Healthy growth returns to PV market in 2010 as economy recovers and U.S. stimulus package and Chinese incentives start to take effect.
4. Market for semiconductors used in solar photovoltaic systems, while still small, is set to triple in size over the next five years
5. The strong get stronger. PV producers able to invest through the downturn will reap rewards during the upturn, as recession-driven PV price declines help close the "grid parity" gap, boosting sales.

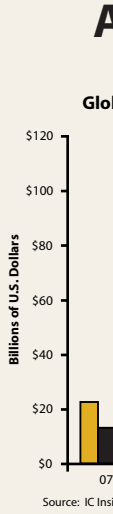
IC Insights

Understanding Our Silicon Cousins — A Semiconductor Industry's Perspective of Solar

It's only been a blink of an eye since the solar PV industry was living off the chip industry's table scraps—repurposing left-over wafers and melting down the cut-off ends of silicon ingots to make solar cells. Now the solar industry consumes more high-purity polysilicon than the semiconductor industry and is rapidly pulling away as it grows by leaps and bounds. Solar cells are in fact oversized photodiodes, often included with other semiconductor devices in technology classification trees.

But the solar PV industry is different, primarily because it is from the outset an upstart challenger in one of the world's largest commodity markets, the market for electrical power production. It is a potential energy game-changer, switching the emphasis from building big power plants to building big plants that manufacture the elements of distributed power generation. The technology and manufacturing innovations used in solar are related to those of the IC industry—but they are also profoundly different—in ways that chip-industry veterans need to understand clearly as they contemplate the possibilities, opportunities, and potential pitfalls of the burgeoning solar industry.

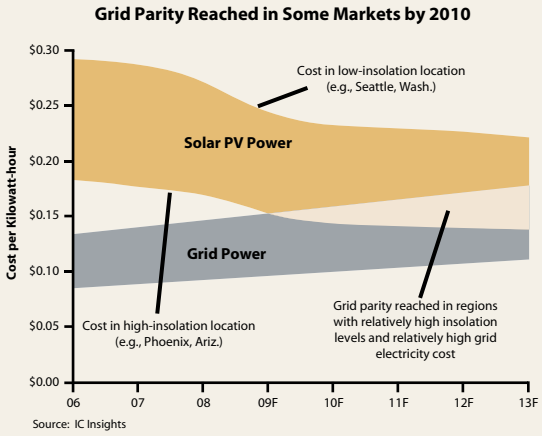
In its new *Solar Energy: Growth Opportunities for the Semiconductor Industry* report, IC Insights explores and analyzes this important growth market for the first time with an eye to the interests of participants of the semiconductor industry in gaining a clear understanding of solar technologies and markets and finding ways to exploit existing and upcoming opportunities.



Included in the report:

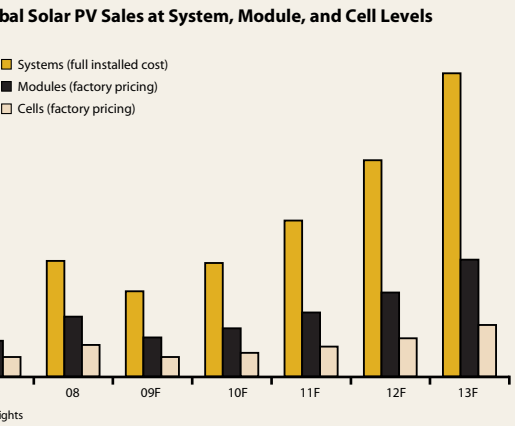
1. Executive summary of solar PV market conditions and forecast
2. A review of the PV industry's context and landscape
3. Assessment of current and potential technology challenges to mainstream wafer-based solar cells
4. How different technologies fit into different solar market segments
5. Marketshare forecast: thin-film PV vs. wafer-based cells
6. A look at the changing role of government incentive programs in driving demand for solar PV systems
7. Country-by-country end demand forecast for top markets
8. Ranking of the top solar PV device suppliers
9. Summaries of top PV suppliers' technology, strategy, and growth plans
10. Changing priorities: PV industry's push to thinner wafers and other silicon-saving strategies re-evaluated as the price of silicon plunges
11. Capital spending forecast for solar cell industry
12. Assessment of the critical change in conditions taking place in the polysilicon market and its consequences
13. Semiconductor content of typical solar PV systems
14. Market forecast for semiconductors used in solar-energy systems—a small but rapidly growing segment

Solar Industry Dependency on Government Subsidies



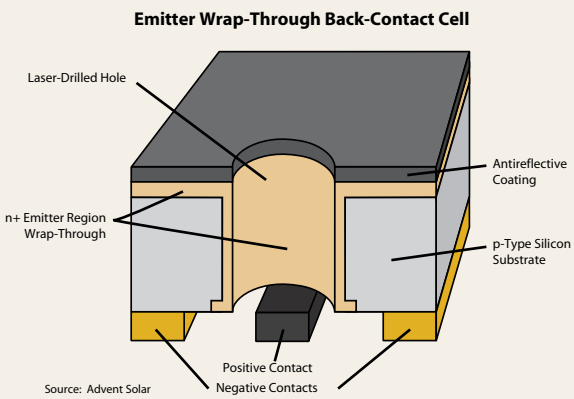
Solar power still costs significantly more than grid power—most of which is generated by burning fossil fuels—and thus requires government subsidies or other regulatory support to justify system installation in almost all markets where grid power is available. However, the cost of grid power is rising and the cost of solar power is dropping (rapidly, at the moment), such that solar is entering a period when it makes economic sense to install in some sunshine-rich markets without any government incentives.

After a Short Break, Solar Growth Surge to Continue



The market for solar photovoltaic devices has grown at a spectacular rate over the last several years, nearly doubling in size in 2008. But a confluence of events—the recession and credit crunch that struck in late 2008, a major pullback of government incentives in Europe, and a turnaround in the market conditions prevailing in the silicon feedstock sector—have conspired not only to undercut demand in 2009, but to encourage price cutting in the PV cell and panel markets. However, new government incentives are expected to gain traction in 2010 in the U.S. and China, shifting the solar PV market back into strong growth mode, a condition forecast to continue for at least four years.

A Hotbed of Device and Manufacturing Innovation



Innovations in both solar cell design and manufacturing techniques for cells, modules, and thin-film panels continue to improve the efficiency of solar PV devices and reduce manufacturing costs. For example, back-contact solar cells have an array of holes drilled in them by lasers, allowing current to flow from the front electrode, through the holes, and to contact structures on the back of the cell. This reduces or eliminates the metal patterns on the front of the cell that block some of the light that falls on the surface, and allows electrons to be collected both at the front and in the back of the cell, boosting efficiency. It also allows for planarized module construction, reducing module manufacturing costs.

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ABOUT THE AUTHOR

Jeremy Young is an independent writer/researcher with 30 years of experience in the electronics industry covering technology, markets, suppliers, and business conditions for a wide range of component and equipment types, as well as associated manufacturing activity. Most recently he was co-founder and editor in chief of *The Semiconductor Reporter*; he has also served as vice president of marketing at Partminer Inc., publisher of *Semiconductor Business News*, editor in chief of *Electronic Buyers' News*, and executive editor of *Electronics* magazine.

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