

Trends in the Solar Market

Special Report

As an investor, you're obviously at least aware of the now ubiquitous solar market.

But simply being aware of it is no longer enough. To really make money in this industry — predicted to grow 48% annually from 2008 to a size of \$100 billion globally by 2013 — you must first fully understand how a solar panel comes to be and which companies specialize in each step of the process.

The Solar Panel Process

Long before a solar panel (called a *module* in the industry), can be installed on a business or household rooftop, there are many steps that take place.

It all starts with plain ol' sand, from which silicon is extracted via various chemical processes.

The refined and nearly pure silicon, called polysilicon or poly, is then heated and cast into cubes, called ingots.

Cube-shaped ingots are then sawed into square wafers. And then the magic happens.

The polysilicon wafers are then placed on a substrate, usually glass, to make a solar cell. A number of cells are then arranged together and set in place to form a panel. The final package is called a module.

That's how a [solar panel](#) is made in a nutshell. But hidden in those few steps are hundreds of companies, thousands of patents, and more than a few investment vehicles that can make those in the know a lot of money.

2010 Solar Energy Overview: Examining the Solar Profit Process

Let's take it step by step.

At the very beginning of the value chain we have polysilicon producers, of which there are a few big players and a few hope-to-be big players. The product at this level is a commodity, so the low-cost provider wins as long as the product is pure and consistent.

Companies here include Norway's REC Silicon, a division of Renewable Energy Corporation (OSL: REC), German company Wacker Chemie (Frankfurt: WCH), and privately-held Hemlock Semiconductor Corp.

Advantages in the poly industry stem from adjustments to levels of purity, using recycled or scrap materials, and vertically integrating (more on that in a bit), to reduce operational costs and improve margins.

Remember, poly is a raw material and a commodity — any saved cost creates a competitive advantage.

There are now several companies in the wafer space, but only a few operate as pure or near-pure plays. MEMC Electronic Materials (NYSE: WFR), whose ticker symbol hints at its business, is a big player here and is also a participant upstream in the poly business. Renesola (NYSE: SOL), is also gaining traction.

These first two links in the solar chain have fallen victim to declining silicon prices, which have gone from over \$400 per kilogram to \$100 per kilogram in just the past few quarters, with \$60 per kilogram likely soon. The sharp decline was induced by a sudden oversupply as companies rushed to build new factories to meet rising demand. Just as a glut of supply came online, the future demand picture was muddied by the global recession. . . and prices plummeted.

The New York Times reports that analysts are predicting a further drop of up to 20% in polysilicon prices in 2010.

You'll want to wait until demand visibility returns before dabbling in this sector.

The cell stage is where we begin to see a great deal of participants. It's also where we see the most diversity in business models. Some companies, like JA Solar (NASDAQ: JASO), focus exclusively on producing cells. The more common approach is to vertically integrate, which means participating in the upstream and downstream segments of the solar market.

Here we have companies like Solarfun (NASDAQ: SOLF), Yingli (NYSE: YGE), SunPower (NASDAQ: SPWR), Q-Cells (XETRA: QCE), and a number of other major players. The idea is to control the silicon process from ingot to module, cutting costs by not having to purchase individual materials or parts at the spot price or via contract. It also ensures consistent quality and the protection of intellectual property.

The only problem is, it's highly capital intensive to vertically integrate because you have to build factories that produce all the materials involved. Tightening credit markets have created a situation where many companies are not able to secure financing, forcing them to stall or cancel expansion plans.

Not being able to expand means not being able to increase capacity, leading to no new sales growth and reduced stock valuations, which we're seeing now.

The last step is the production of a solar panel or module by arranging cells together, binding them, and adding the electronic components. This is what companies get most noticed for, like Suntech (NYSE: STP), and First Solar (NASDAQ: FSLR), though the latter doesn't use silicon at all.

But as we've seen in the other segments of the solar chain, falling prices for poly mean that cell and module prices will come into the range of affordability for many consumers, which can be very beneficial for market growth.

In the long-term, price reduction is good for the industry because it allows solar to compete with the going rate for retail electricity. But the rapid decline has left most producers holding the bag, sometimes having to sell panels at less than cost or with a negative margin.

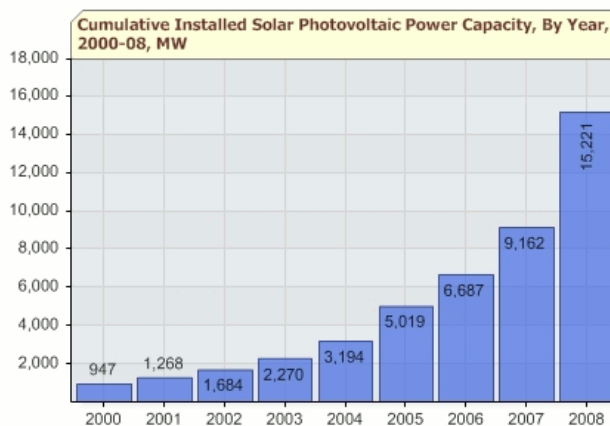
The industry, however, isn't going away — not by any stretch of the imagination. Global installed capacity is still forecast to grow about 22% in 2010.

There is plenty of growth left for this industry that doesn't even come close to producing 1% of our energy needs yet. Recent government mandates and incentives will ensure homeowners and financiers have good reason to put solar on their roofs or to fund large new installations. Those mandates, combined with an anticipated national renewable portfolio standard and carbon caps in the U.S., will spark demand once again.

In fact, the Claymore/MAC Global Solar Index ETF (NYSE: TAN) recovered from the market nosedive in 2008 to gain nearly 25% in 2009.

Solar Growth Trends

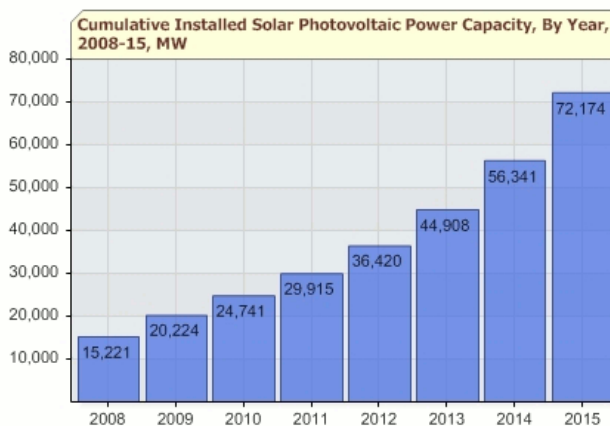
Here's a chart I've used before*:



That's a visual representation of installed solar capacity since the turn of the century. If the chart looks impressive, it's because the solar market grew over 1,500% in those eight years, from less than a gigawatt to well over 15 gigawatts.

For nearly a decade, the industry surged ahead with a compounded annual growth rate over 40%, and *Green Chip* investors made a lot of money on the companies making it happen.

And the solar market is set to triple in size in the next five years!



By 2015, installed solar capacity will grow another 347% to over 72 gigawatts as utilities worldwide are incentivized and forced to adopt sustainable production assets, and as solar energy reaches price parity in a growing number of markets.

In order for those forecasts to hold true, improved policy is going to have to do battle with current economic conditions.

The Current State of the Solar Market

The solar market is currently facing rapidly falling prices, both for its raw material and its finished product. I spent some time on the subject in a recent *Green Chip Review* article.

A seasonal dip in demand and the related oversupply of panels coupled with the general economic slowdown and restricted lending has led to an up to ~30% decrease in selling prices for solar modules.

Of course, the operating costs of solar companies haven't fallen as quickly, forcing companies to reduce profit margins as they sell discounted panels. In fact, in the recent price scramble, Chinese manufacturers have opened an advantage over historically dominant European companies.

Established Chinese producers are currently offering contracted prices of about €2.00 per watt, while European suppliers are struggling to break below €2.50 per watt.

As such, [Chinese solar companies](#) are poised to gain some European market share. You should see that reflected in their share prices over the next few quarters.

First Solar (NASDAQ: FSLR), of course, with their cadmium telluride thin film technology, is still the industry cost leader, able to produce panels at less than \$1.00 per watt. As the industry's continuously preferred supplier, FSLR should also be your preferred solar investment.

But even at \$1.00 per watt, First Solar's stock took a ~50% hit over six months as investors feared a continued recession and tight credit would further dampen new project starts.

Less dominant solar stocks fared even worse, down 60% or more in the same time.

But new indicators are pointing to loosening credit for solar projects, and global government efforts to stimulate the industry are about to pay off for the solar industry and those who invest in it.

Regreasing the Solar Wheels

Even with the economy in the pits, the German solar market--the largest in the world--is still set for steady growth, thanks to renewed lending by German state bank KfW and national political commitment. Funding for rooftop and small ground installations is also flowing again from large European investment banks and local savings banks.

Other countries in the European Union will take longer than Germany to heat their solar markets back up.

So if you invest in solar, you should make sure the company has exposure to the German market, which will be one of the earliest to recover.

I think we'll also begin to see some space emerge between solar companies that once moved in stride. An oversupply of panels means distributors and integrators can be highly discriminate when it comes to choosing which company they patronize.

Only the most [highly efficient panels](#) with the best prices and best warranties will be purchased. Smaller Chinese companies are probably the most at risk.

Balance sheets for all solar companies will be off for the next few quarters as reduced demand from the recession and cyclical seasonal patterns works its way off balance sheets.

In addition to Germany, the U.S.-considered the sleeping giant of the solar industry-is also doing much to ensure a robust solar rebound.

Here's just a bit of what our recent stimulus did for the solar industry, as I told it to *Green Chip* readers:

Investors are now able to take a 30% federal refund on the value of a new installation before deducting any state incentives. So a theoretical \$100.00 dollar solar system in North Carolina (35% state credit) now only costs the investor \$35.00--because both federal and state incentives are now calculated from the full price. Best part is, those federal incentives have no cap and the project need only be finished by 2017 to qualify.

This incentive alone will rapidly increase solar demand as homeowners and investors alike rush to get discounts on solar installations on the taxpayers' dime. But there are many more solar provisions in the stimulus that will only magnify the gains that can be taken on the right solar stocks.

There's also \$6 billion dedicated to paying the fees on guaranteed loans. This clause is aimed at encouraging banks to make loans for renewable projects. Most estimates say that \$6 billion in guarantees will translate into \$60 in new loans.

And Congress didn't stop there.

They also guaranteed profits for you by setting aside \$5.5 billion so federal buildings (including schools) can increase energy efficiency and their use of renewable energy. The U.S. General Services Administration (GSA) estimates that 75% of the projects that receive this funding will use solar technology.

For a full list of solar benefits included in the stimulus, [click here](#).

Those provisions have led most analysts to forecast year-over-year solar installations to double in the U.S., from ~300 MW to between 600 and 700 MW. Another doubling is in the cards, and by 2016 solar capacity in the U.S. could rival current worldwide capacity. . . hence the sleeping giant.

Bottom line: the solar industry is still facing turmoil. Credit is still hard to come by, but there are opportunities for low-cost, high-quality providers. The second quarter will probably be the low point for installations, as weather in major markets begins to ease. First Solar currently has the best cost, and major Chinese producers are next in line. Changing global policy should incite a strong rebound, with the raw material side of the business remaining subdued a bit longer.

You can view the HTML version here: [Trends in the Solar Market](#)

publication. They may have substantial positions in the securities recommended and may increase or decrease such positions without notice. Neither the publisher nor the editors are registered investment advisors. Subscribers should not view this publication as offering personalized legal or investment counseling. Investments recommended in this publication should be made only after consulting with your investment advisor and only after reviewing the prospectus or financial statements of the company in question.