



Illustration by Robert Megarick

A sunny DISPOSITION

By John Rubino

**Should investors forecast a change
in the weather for solar power?**

To understand the enigma that is solar power, consider the following two statistics: Global demand for solar panels (also known as photovoltaics or PVs) is projected to be 700% higher in 2015 than in 2008. But by year-end 2012, the average solar equity was down more than 90% from its 2008 peak.

So what is it: epic growth or horrendous bust? The answer is both, depending on the time frame. Like the microchip industry, which also uses silicon but turns it into microprocessors instead of photovoltaics, the solar panel business is capital intensive and subject to wild supply–demand fluctuations. It resembles the microchip industry in another way: Busts set the stage for more impressive booms. If the pattern holds, solar once again will be a sector in which quick fortunes are made. The trillion-dollar question is when the next boom will happen.

DARK NIGHT OF THE SOL

The solar power story begins early in the previous decade, when governments around the world decided that alternative energy was worthy of encouragement. Germany led the way with a “feed-in tariff” that required electric utilities to buy power from rooftop solar arrays at extremely favorable rates. Businesses and homeowners responded with enthusiasm, making Germany the world’s leading solar-power market.

Extrapolating Germany’s experience to bigger, sunnier markets, investors bid the price of solar stocks into the stratosphere. Capital for new factories poured in, and the industry expanded aggressively. Global production capacity for both polysilicon (the industry’s main raw material) and solar panels soared (see chart).

Then China decided it wanted to own the industry. “Both the central and provincial governments provided cheap financing, tax breaks, and land,” says Pavel Molchanov, energy analyst with brokerage house Raymond James in St. Petersburg, Florida. “Ten years ago, China barely had a solar industry. Today, it manufactures three-fourths of the world’s panels, and its companies are very aggressive about taking market share.”

This surge in capacity was first felt in the polysilicon market, where the average price fell from US\$400 per kilo to US\$16. “Inventory from previous projects was carried on panel makers’ balance sheets at higher prices,” recalls Edward Guinness, manager of the London-based Guinness Atkinson Alternative Energy Fund. This led to a series of write-offs that produced big losses, despite still-robust solar panel demand.

Europe, meanwhile, was getting a bigger-than-expected response to subsidies. “They realized that solar installations were growing at an unsustainable rate,” says Molchanov. “In 2011 and 2012, they scaled back their subsidies, and European markets slowed.” As a result, falling demand from the biggest solar market slammed into soaring supply from China. “That movie did not end well,” says Molchanov. The Market Vectors Solar Energy ETF (KWT), which owns most of the major solar stocks, fell from 600 in 2008 to 27 in January 2013 (see chart).

BREAKING DAWN?

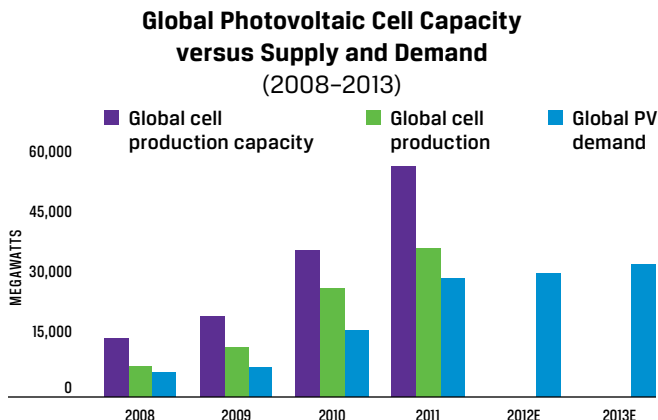
During the first half of 2013, solar equities started popping, with several big names more than tripling. To Molchanov, however, “this is a junk rally—or more accurately, a high-beta rally. In a general bull market, more speculative stocks tend to rise, and solar has moved along with the rest.”

But the turn will come eventually, and the price action of early 2013 gives a hint of how spectacular the recovery might be. Going forward, the timing and shape of solar’s recovery will be determined by nine key factors.

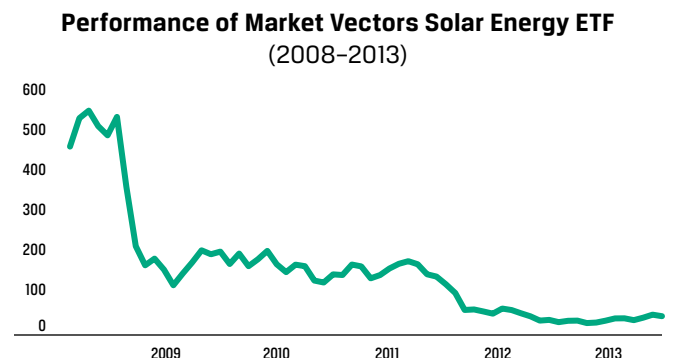
(1) SUPPLY AND DEMAND ARE TRENDING TOWARD BALANCE. “In 2013, European demand will be down again, but the rest of the world is picking up. China is the biggest growth driver, with Japan and the United States accelerating,” says Molchanov.

Moreover, supply is growing more slowly. “Towards the end of last year, Chinese companies pulled back sharply on capital investment,” notes Molchanov. Although overcapacity remains “across the value chain,” he sees it shrinking from 34% in 2009 to 10% in 2014.

(2) MARGINS ARE LOW BUT RISING. Industry gross margins were zero in Q1 2013 and in low single digits in the second quarter, with high single digits probable by year end, according to Molchanov. “This is still very poor on an absolute basis, but at least it’s moving in the right direction,” he says.



Source: Based on data from *Photon Magazine* (March 2012), European Photovoltaic Industry Association, and RJ estimates.



Source: Based on data from Yahoo! Finance.

(3) PRODUCTION COSTS WILL CONTINUE TO DECLINE BUT MORE SLOWLY. In 2008, a typical solar panel cost about US\$3 per watt to produce. Today, it costs about US\$0.75, thanks to a combination of plunging raw-material prices and process optimizations. Both of those factors are reaching their limits. “The price of polysilicon appears to have bottomed,” says Molchanov. “And the panel-making process is highly efficient. So, cost declines will continue, but they won’t be as dramatic as they’ve been over the past five years.”

The major trend in the coming decade will be the integration of solar panels into building materials, says Guinness. “Putting aluminum frames on your roof is not the elegant final solution, whereas with solar roofing tiles, for instance, you’ll be adding solar capacity during construction.”

(4) SUBSIDIES WILL REMAIN NECESSARY. The holy grail of renewable power is “grid parity,” the point at which an alternative energy source is as cheap as coal-fired, grid-delivered electricity. Because solar fuel is sunlight, one would expect solar to be closest to grid parity in sunny climates, such as Arizona or southern Spain, but this is not the case. “For solar, grid parity is less about how sunny a market is than about the cost of conventional power,” says Molchanov. For example, Arizona has plenty of sun but also relatively cheap coal, gas, and nuclear power, whereas Hawaii and Japan have relatively expensive conventional grid-delivered power, which makes Hawaii the only place in the United States with grid parity for solar. In the coming decade, the fastest growth will continue to be where the subsidies are most generous.

(5) GEOGRAPHY MATTERS LESS THAN IT USED TO. Not so long ago, subsidies and trade barriers were a crucial part of the solar investment calculus, because domestic producers tended to benefit disproportionately from host-country machinations. But the formula is less true today. “Solar is now a commoditized market,” says Guinness. “Technological differences are not that big, so buyers focus mostly on price per watt.”

And tariffs notwithstanding, China remains the low-cost leader. Japan, the world’s leading market 10 years ago, fell behind in installations after dropping its subsidy programs, “so the local manufacturers—mostly divisions of larger corporations—didn’t go through the competitive reduction in price,” says Guinness. “The gap between Japanese prices and international prices has grown so dramatic that the Chinese manufacturers have gained huge market share in Japan.”

Meanwhile, “many of the European panel makers are bankrupt,” says Molchanov. “The non-bankrupt ones would benefit from tariffs [now being considered by the European Union], but unless the tariff is very steep, it would not change the fact that manufacturing solar panels in China is intrinsically cheaper than doing it in Europe. It’s not just labor but also energy costs, ironically.”

In any event, tariffs are not solid walls. “U.S. tariffs [imposed in 2012] were done so incompetently that panel manufacturers found a way around them in about three days. Volumes went up and prices fell in the quarter after they imposed the tariffs,” says Guinness.

(6) THIN FILM HAS HAD ITS DAY. Not so long ago, the future appeared to belong to solar “thin film” technologies, some

of which replaced silicon with exotic mixtures of obscure minerals, such as cadmium and indium. The resulting panels were cheaper, lighter, and more flexible and seemed to portend an era of roll-on (or spray-on) solar cells covering nearly everything, including rooftops, windows, and T-shirts.

That dream has been deferred. “When polysilicon panels cost \$4 a watt and thin film was at \$1.60, thin film had a huge cost advantage. But with modules at \$0.75, thin film has lost its cost advantage,” says Guinness. Another strike against thin film is that some of its components are toxic. “[Dominant thin-film maker] First Solar’s cadmium telluride products need to be more carefully disposed of because cadmium is toxic, so you have a back-end liability,” says Guinness.

(7) BEST-OF-BREED PANEL MAKERS WILL LEAD THE TURN. In a recovering but still traumatized market, capital will initially flow to the strongest players, says Guinness, who defines strength as “a competitive cost structure, a solid balance sheet, and a reputation for quality. These are the top-tier manufacturers, the ones most likely to survive.” He cites Chinese panel maker Trina Solar for its “relatively strong balance sheet, no debt maturing near-term, no international debt—which is quite important—and relatively low manufacturing costs.”

(8) DON’T COUNT ON BUYOUTS. A common strategy for playing a troubled industry is to focus on weaker players with valuable assets that might be take-out candidates. That may not work for solar, says Guinness. “There will definitely be some M&A, but I would expect it to take the form of mergers between leading players. I don’t think you’ll see companies buying up smaller rivals because the actual cost of adding new capacity is relatively low, and if you want to be competitive, you need state-of-the-art equipment. So buying a competitor with old production lines doesn’t produce an advantage, especially if you are an existing player with expertise and channels to market.”

(9) AND THE SHORTS ARE “IRRELEVANT.” Big short positions, which are now prevalent in solar, can be both worrisome (what do they know that you don’t?) and potentially bullish because shorts have to be unwound at some point. Arguably, the share price pop of early 2013 was driven in part by short covering. This could happen again, says Guinness. “But it’s irrelevant. I think that you might see a short squeeze over a few days, but if you’re thinking long term, people taking short positions just provide additional liquidity.”

John Rubino, a former financial analyst, is author of *The Collapse of the Dollar and How to Profit from It*.

KEEP GOING

“The Global Impact of the U.S. Shale Energy Boom,” CFA Institute Take 15 Series [www.cfawebcasts.org]

“Good Derivatives: A Story of Financial and Environmental Innovation (a summary),” Research Foundation Publications (June 2013) [www.cfapubs.org]

“Boosting Renewable Energy,” *CFA Institute Magazine* (March/April 2013) [www.cfapubs.org]