

Putting Knowledge Into Action



February 27, 2006

Solar Markets Reality Check

*By Peter C. Fusaro
Chairman, Global Change Associates*

I recently had the pleasure of once again looking at the commercial future of solar power at Piper Jaffray's "Opportunities in Solar and Clean-Tech Symposium" in New York last week. 19 public and private companies presented their business models to the New York crowd of savvy investors. The bottom line is that the market may be ahead of itself. The stock equities look fairly valued. The science needs to get better, i.e., read "more efficient." No major scientific breakthroughs appear on the horizon, but the good news is that this is a global market that is awakening. In fact, it may be the beginning of a global "mega trend" in renewable energy sustained by higher oil and gas prices, rising concerns over the environment, and public policy mandates. To put this into some context, it should also be remembered that solar accounts for 0.1 percent of global energy markets but has been growing at up to 40 percent per year. Growing from a small installed base, it is rising rapidly. Projections are that the global solar market will be \$30 to \$40 billion market by 2014, according to some estimates. It will be a less incentivized market, and is poised to enter the global power markets which are \$1 trillion in size.

What are the market drivers for solar today? One obvious driver is high energy prices. But another is the need for higher grid reliability, as well as back up power applications. Rising concerns over the environment are a very important driver. There is an increasing linkage of renewable power and the application of portable power devices. Once again, the drivers are many and not easily modeled or predicted by the static models of the past.

The European and Japanese solar markets were jump-started by incentives and now work without them. The same thing is now going to happen from the impact of California's \$2.9 billion solar initiative. It will create the new market push. The rise of energy security issues and the need to utilize domestic energy resources are icing on the cake.

The most important factor that is catching many by surprise is that globalization trends also now apply to solar. Korea now has the beginning of a renewable energy market while it has been dependent on coal, gas, oil and nuclear power. China has moved

forward with the implementation of its renewable energy law on January 1, 2006. India is rising through both green hedge funds and carbon reducing projects that will benefit from the Kyoto Treaty and needs for rural electrification and grid reliability,

Is Stirling Energy Model Replicable?

One interesting play domestically is Stirling Energy Systems and its connection to the California RPS. There are now two large projects in Southern California that will benefit Stirling's technology which was initially developed by Ford in response to the initial energy crises of the 1970s. Its facility outside Albuquerque, New Mexico has run over 33,000 hours with 29.4 percent peak efficiency. The company is a peak demand play due to its high generation costs. Now the company will sell between 500 to 850 MW of power to Southern California Edison by late 2008 under a 20 year purchase power agreement. Power will be generated in the Mojave Desert near existing transmission lines. The second big project for Stirling is with Sand Diego Gas & Electric, to build out from 300 to 900 MW of peak load. The company is going to a new round of private funding soon. Stirling is now positioning itself for a ramp up for high volume production. It is basically a southwestern United States play at the moment whose devices track the sun's movement. The sun shines over 330 days in that part of the country. With some imagination, Stirling should marry its peaking technology to off-peak battery or compressed air storage. That's called arbitrage, but let's just hope that their world-scale solar projects work well. They are building tens of thousands of their devices. Hydrogen gas is used to refill the engine every six to 12 months. This is still a large-scale peak power play. This is a large scale application where the sun shines most of the time, existing power prices are high and peak demand needs to be either clipped or supplemented. Does that sound like Southern California or what?

Rising Dependence on China

The one thing overlooked in all this solar technology build-out is increased dependency of solar outsourcing to China. Not only are Chinese public companies in the space, but many U.S. and Canadian companies are also outsourcing their manufacturing to China. China is the lowest cost manufacturing base for solar. The bottom line is: too much outsourcing to China, where intellectual property laws are virtually non-existent, seems very risky. It seems to me that supply diversification would be a more sanguine strategy for the solar power industry too focused on bottom line results rather than strategy. Youthful exuberance over China does not understand the Chinese mentality of patience and waiting.

So Where is Solar Today?

Solar today costs between 22 to 29 cents per kwh. The target of manufacturers is to get the conversion efficiency up to 20 percent and beyond. They also want to get solar cell manufacturing costs down. They have already reduced those costs by a factor of 10 since the 1970s. The next breakthrough is to half those costs to 10 to 11 cents per kwh. Therefore, the bets are on technology to create higher conversion efficiencies. There are nanosolar plays, which may further reduce costs and create higher quality efficiency, and this is more of a materials science play. There is some traction to modularize design of

these devices. The other factor is that much silicon is used in semiconductor manufacturing, so there may be a need for new business models such as the string ribbon manufacturing process and nano to further develop capacity. Metallurgical silicon now looks promising. The need is to diversify both supply sources and manufacturing techniques.

What does seem inevitable is that a solar renaissance is upon us. The silicon capacity crisis will pass in coming years as new capacity comes on line. Companies will focus on high-growth markets and may build out in smaller, regional markets where opportunities present themselves. Technology innovation changes will force more dramatic cost reductions. Today, the global renewable market is demand-driven proving that the world is indeed flattening. Trading the s-recs will not be far behind.

Peter C. Fusaro created the term “Green Trading” and runs his annual Wall Street Green Trading Summit on April 4th and 5th in New York City. For additional information, please visit, www.hedgeconnection.com/wsgts.

© 2006, UtiliPoint[®] International, Inc. All rights reserved. This article is protected by United States copyright and other intellectual property laws and may not be reproduced, rewritten, distributed, disseminated, transmitted, displayed, published or broadcast, directly or indirectly, in any medium without the prior written permission of UtiliPoint International, Inc.

UtiliPoint's[®] IssueAlert[®] articles are compiled based on the independent analysis of **UtiliPoint[®]** consultants, researchers, and analysts.. The opinions expressed in **UtiliPoint's[®] IssueAlert[®]** articles are not intended to predict financial performance of companies discussed, or to be the basis for investment decisions of any kind. **UtiliPoint's[®]** sole purpose in publishing its **IssueAlert[®]** articles is to offer an independent perspective regarding the key events occurring in the energy industry, based on its long-standing reputation as an expert on energy issues.

Reprinted with permission from UtiliPoint[®] International **IssueAlert[®]**. Further reproduction or distribution is prohibited without permission.