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A Note from the Editor

By Eric Olson

As G8 political leaders meeting in Japan struggle for consensus on post-Kyoto pathways to effective global climate policy, the pace of innovation in business and national/local government programs remains brisk.

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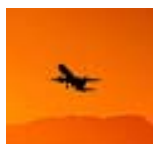
Our feature story -- [Can the Solar Industry Spin Sunlight into Gold?](#) -- highlights the challenges -- as well as opportunities -- faced by players in that rapidly evolving business, as major players enter the market with innovations and production capacity that promise to change the game (see item on National Semiconductor's new more efficient chip for PVs).

An important new report from WRI highlights ... [Read the rest online...](#)

The Latest News on Business and Climate Management

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By ClimateBiz Staff



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The G8 Climate Scorecards 2008 found that the U.S. has done the least among the world's eight largest economies to address global warming. The study also said none of the eight countries are making significant enough improvements to prevent temperature increases that would cause catastrophic climate changes.

Trees in the Greenhouse: Why Climate Change is Transforming the Forest Products Business

This 74-page report by the World Resources Institute examines how climate change would affect the forest products industry, outlines risks and opportunities, and highlights possible next steps and strategies for the industry and investors.

Featured Story

Can the Solar Industry Spin Sunlight into Gold?

By Lee Barken

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Can the Solar Industry Spin Sunlight into Gold?

By [Lee Barken](#)
Published July 9, 2008

[Energy & Climate](#) » [Clean Tech](#); [Renewable Energy](#);

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An old joke begins, "How many engineers does it take to change a light bulb?" Sitting in the audience at the June 2008 [IntertechPira Photovoltaics Summit](#) in San Diego, one would expect that light bulb to be powered by the sun. However, in this crowd of nearly 180 business leaders, engineers and scientists, an informal question posed by presenter Mark Culpepper, VP of Enterprise Solutions for [SunEdison](#), revealed that only four people in the entire audience currently have solar

power deployed on their own home or business.

Why is it that the foremost solar enthusiasts and industry luminaries aren't drinking their own champagne or feeding Fido their own dog food? The answer, according to Culpepper, "Right now, it's just too damn expensive."

Offering cost effective systems on a commercial scale requires the realization that while renewable energy has enormous social and ecological benefits, the carbon footprint must be considered next to the cost footprint. As eloquently observed by industry expert and icon Paul "Boomer" Maycock, President of PV Energy Systems Inc., "Implementing a solar system does not help you lose weight, smell better or become sexier." When you turn on the light bulb, power is power. In other words, selling electrons is a commodity business.

Making Solar Sexy

If one electron looks the same as the next, then one way to set yourself apart from the crowd is to focus on the way those electrons are captured. This philosophy, embraced by visionary CEO David Saltman, is exemplified in his company's elegant and innovative building-integrated photovoltaics (BIPV) product line. His company, [Open Energy Corporation](#), offers solar panels that blend seamlessly into homes & buildings.

While other engineers argue over the relative merits of polycrystalline silicon (poly-Si) versus copper indium gallium selenide (CIGS), Saltman seems to intrinsically understand that building contractors want fire rated, UL certified roofing materials and homeowners want solar panels that look like standard cement tiles, not like Star Trek convention souvenirs.

No matter how customer tastes shift, one thing is certain: the industry won't really take off until solar power reaches the same cost as traditional grid-supplied energy, something called "grid parity" amongst summit attendees. The consensus in the crowd here was that solar will hit this milestone sometime between 2012 and 2015.

Reaching grid parity represents a significant first step in developing a critical mass of widespread solar deployment. Once presented with the choice of equivalent-cost energy from the sun versus legacy pollution-belching power plants, the theory is that consumers will fall like dominoes into the renewable energy era. However, the challenges facing the industry are far from trivial.

Sunshine Around the World

A closer examination of global solar demand reveals that double digit growth continues to be the norm. According to Paula Mints, Principal Analyst at Navigant Consulting, global demand for PV was 3,073 megawatts in 2007, compared to 1,985 mW in 2006. This impressive 55 percent annual growth rate in 2007 follows on strong growth in 2006 and 2005 (41 and 34 percent, respectively).

However, the dirty little secret behind all of the numbers is that the market for PV products is primarily driven by government incentive programs, which may be sending faulty investment signals to the financial community. Unlike traditional market driven supply and demand curves, the growth experienced in the last few years can be directly attributed to global government incentives. Therefore, forecasting industry growth becomes more of an exercise in guessing at future government policy decisions, an activity perhaps best left to Ouija boards and Magic 8-Balls.

People Respond to Incentives, or 'Is There a Market for Solar?'

Of the 3,073 mW of panels shipped worldwide in 2007, nearly 50 percent went to Germany, a country plagued with poor natural sunlight conditions roughly equivalent to those found in Alaska. The fact that half of global demand comes from a single country is a direct reflection of the strong incentive programs in place there. In Germany, the government has created a "feed-in tariff" program that guarantees utility companies will purchase solar generated electricity from customers at a highly attractive and above market rate.

As a result, it shouldn't be a surprise that Germany has led the U.S. in solar deployments by a significant margin. Compared to Germany's 1,429 mW of solar cell deployments in 2007, the U.S. demand reached a paltry 305 mW. In other words, if this was a soccer match, Germany would be beating

July 17, 2008
5:30 p.m. - 8:00 p.m.

Cleantech Venture Capital Investments: The Next Wave

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Dan Adler - President, [California Clean Energy Fund](#)
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the U.S. by nearly 3 to 1.

Should similar incentive programs be implemented across Europe, countries such as Spain, Italy and France have the potential to drive worldwide consumption even higher. However, if incentives are cut back around the world, it is likely that the solar industry will suffer.

Another example of how people respond to incentives can be found in solar's renewable energy cousin: the wind power industry. Curious about the link between sales and subsidies? Just ask wind energy manufacturers like [General Electric](#), who saw a 76 percent decline in sales after a lapse in wind power subsidies.

Since 90 percent of PV sales in 2007 were to subsidized markets, one must ask the question: Is that really a market? Or, more specifically, if the subsidies are short-lived, will they stimulate enough demand to develop a massive solar supply chain capable of providing a grid-parity alternative energy product before the subsidies run out?

Rising Commodity Prices

"Photovoltaics is a materials-dominated game," says Dr. KV Ravi, director of [Applied Materials' Solar Business Group](#). If the door to grid parity is locked by high product costs, the key to unlock the door is to lower the cost of materials that go into solar panel production. According to Dr. Ravi, 65 percent of the cost of polycrystalline silicon modules is found in the price of raw materials, namely silicon. "In fact," he says, "direct labor and depreciation of factory equipment account for only 7 percent and 9 percent of module cost respectively."

If the greatest cost component for silicon solar modules is the expense of the raw materials, then one would expect to see a strong and direct link between the ability to reach grid parity and the underlying price of silicon. With the projected double digit increase in demand for solar power, where is all of the silicon going to come from?

Early generations of solar development relied upon the scrap silicon byproduct obtained from the semi-conductor industry at a cost of roughly \$12-\$20 per kilogram. Those days are over. As the solar industry has enjoyed rapid growth, it has required more and more silicon, far exceeding the demands of the semiconductor industry itself, which it now dwarfs.

As noted by Paul Macock, "the last 5 years of growth from 500mW to 3,000 mW has created a silicon shortage." While very large players can obtain bulk contracts directly from manufacturers in the \$70-100/Kg range, the spot market has seen prices fluctuate wildly, sometimes as high as \$200-\$300/Kg, if you can find it at all.

In order to support the lower costs required by grid parity, many analysts are predicting long term silicon pricing will need to settle into the \$40-\$50/Kg range. In fact, some companies position their silicon supply as a source of competitive advantage. Says solar entrepreneur Tom Rust of Photon Energy Systems, "We have strategically identified and secured long-term sources of silicon in order to ensure scalable production capabilities."

Golden Sunlight?

Just as we saw in the mid 1800's with the discovery of gold in California, shiny and valuable objects seem to attract the masses. More than 500,000 people from around the world came in search of riches from 1848 to 1855. Meanwhile, a variety of merchants started selling picks and shovels to the miners. Eventually, the streets were lined with commercial products and services being offered to the growing gold rush.

With growing PV demand and rising material costs in the air, the stage was set for Peter Fath of German silicon factory builder SolMic, who quipped that "You too, for a mere \$250 million Euros, can be in the solar game and produce silicon in the world market."

On the other hand, avid triathlete and CEO Roger Little of Massachusetts-based turnkey manufacturing equipment maker Spire Solar, retorts with an offer that "You can get into the PV module assembly business for as little as \$2 million US dollars." Are entrepreneurs taking the bait?

Following the siren's lure of 44 percent compound annual growth rate experienced by the industry in the last 5 years, the answer seems to be a resounding yes. "The growth rate is certainly attracting attention," notes venture capital veteran Tim Woodward, managing director of VC firm Nth Power. "What other industries have seen double digit growth like this?" he asks. Woodward points out that in 2007, total VC investments in solar generation reached \$890 million, nearly 3 times greater than investments in biofuels and electric vehicles. He adds, however, that the industry is "getting a bit crowded."

Bright Lights or Lights-Out Ahead?

Some pundits are responding to the anticipated solar industry growth with bitter skepticism, frequently comparing it to the "dot-com bubble." While it's true that unbridled capital investment in the late '90s spurred numerous excesses and abuses, it did leave us with a lasting "game changer." I'm not just referring to market survivors like Amazon, eBay and Google. Rather, the broader implication here is that the dot-com bubble did bust, but it left us with something even greater: a thriving Internet.

Even the short-lived gold rush in California left numerous technological and social innovations, not the least of which was the development of a series of communities into towns and cities which eventually led to the formal creation of the state of California in 1850.

The solar industry and the larger clean tech movement in general have the potential to attract imprudent and even irrational investment opportunities, which some might refer to as "fool's gold." However, the potential for a dramatic "game changer" in ecological terms is simply priceless. The "green rush" of our times has the potential to clear the air, clean the rivers and perhaps even save the planet. And who knows: a few lucky people may even find some gold nuggets along the way.

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