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Can the U.S. Learn to Love Renewables?

by William J. Holstein

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Can the U.S. Learn to Love Renewables?

The CEO of Applied Materials offers a road map for the adoption of solar energy technologies in the United States.

by William J. Holstein

After years of being noncommittal — if not downright neglectful — about solar energy, the United States now has a new chance to become a major player in this arena, says Michael Splinter, chairman and chief executive officer of Santa Clara, Calif.–based Applied Materials Inc. But much has to change for that to occur.

According to Splinter, the U.S. must come to grips with three major pieces of the solar energy puzzle. One is research and development, where the U.S. is already making serious contributions thanks to the efforts of companies like Applied Materials. This company, best known for equipment used in the manufacture of semiconductors and thin-film liquid crystal displays, has earmarked 25 percent of its US$1 billion annual R&D budget for determining whether Applied Materials' know-how can be harnessed to manufacture machines that make solar energy–producing devices.

The second piece is deciding where the solar energy equipment will be made. So far, almost none is manufactured in the United States. And the U.S. is well behind Europe and Asia, particularly China.

The final piece of the solar energy puzzle is Americans overcoming their resistance to producing commercially significant quantities of solar electricity. The U.S. trails Germany, Spain, and Japan, among other countries, in its production.

Part of the explanation for U.S. resistance is that solar electricity is still seen as being too expensive, and venture capital financing for the industry has been dramatically reduced because of the credit crisis. But there are some bright spots. Applied Materials, with revenue of $8.1 billion in 2008, had sales of nearly $800 million from solar equipment in 2008, up from $165 million in 2007. And Splinter believes that the relatively inexpensive thin-film solar panels made with Applied Materials' machines could have a dramatic impact on U.S. energy production patterns. He says he hopes the company can find ways to deliver efficiency improvements in the same order of magnitude as Moore's Law, which holds that the power of semiconductors should double every two years. In this interview with strategy+business, Splinter shared his views about new solar technologies and the role that the U.S. government should play in making sure that they are adopted.

S+B: Why is the industry so excited about thin-film solar technology?

SPLINTER: If you look at the potential for thin-film solar, the real excitement is about the potential to lower the cost and make it very cost-effective over a period of time, achieving parity with the cost of delivering other kinds of electricity during peak hours. Solar electricity is especially effective in the afternoon during peak electricity use and when electricity costs are highest.

The idea of thin-film has been around for quite some

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time, but Applied Materials has industrialized this technology and made it cost-effective. Companies around the world have purchased our turnkey SunFab factories, but not in the United States.

We believe that thin-film silicon and crystalline silicon on wafers are the technologies that will scale in the short- to medium-term solar market. They will divide the lion's share of sales for the next five to 10 years. There may be some technology disruption over a period of time, but the fundamentals of putting solar on glass or on wafers will stay the same well into the future.

S+B: How are you applying your knowledge about semiconductors and flat-panel displays to the solar industry?
SPLINTER: The kind of equipment we make for semiconductors and displays is very complex, but we can achieve very high volume with it seven days a week, 24 hours a day, 365 days of the year. We've driven down the cost of making semiconductors 20 million times over the past 40 years, and we've driven down the cost of making flat panels by more than 20 times over the past 15 years. These kinds of cost progressions, when occurring in the solar market, will allow for the industrialization of this technology.

Thin-film solar is aimed more at utilities than at residences. It is less efficient so it takes up more space than higher-cost crystalline or other types of solar technologies, but it is much cheaper. Government subsidies in Europe make thin-film even more cost-effective in that market. That's a key role for government — to help these technologies achieve volume and industrial scale so that the cost can come down. Our experience shows that every time the volume of solar electricity generation doubles, the cost per watt comes down by 20 percent. Today, solar is only a tenth of a percent of the world's total electricity generation, so it can double many times.

S+B: You recently met with President Obama. Are you encouraged by the policies that the government is pursuing involving solar energy?
SPLINTER: There's been a good start. The incentive tax credit in the first TARP bill [2008's toxic asset legislation], which gives a 30 percent tax break for renewable energy investments, is helpful, and it was extended so that it could be used by solar project developers and utilities. But in this current environment, where it is very difficult to get financing, it's hard to see the impact.

In the energy bill now being discussed in Congress, a critical element involves setting a goal for renewable electricity as a percentage of all electrical transmission with an incentive for distributed generation. I think we all understand the difficulty with the grid and electricity transmission in the United States today. The system is old and needs to be overhauled. Distributed generation, as a concept, would create electricity close to where it will be used, to avoid suffering the losses caused by transmitting electricity over long distances. It deserves the accelerator or extra incentive that the energy bill provides. And that's where solar comes in, because by its very nature it is local and, hence, distributed.

The other element is that the renewable electricity standard needs to be progressive. The government needs to set goals that we have to reach every two years. If the goal is that 20 percent of all electricity should be from renewable sources by 2020, we have to start on that path today and create real urgency to make progress in the next two years and in the two years after that. And there has to be enough incentive to compel the power companies to engage. I think that's absolutely critical.

S+B: What should Americans do to catch up with other nations around the world in solar technology?

SPLINTER: In the production of solar, the United States is far behind the Chinese and the Europeans. The Europeans are achieving high volume. In particular, the Germans have built an industry by providing feed-in tariffs [which require public utilities to buy solar-generated electricity at above market rates, with the additional costs being spread over the utilities' customer bases] and incentives that foster manufacturing in their country. They've created hundreds of thousands of manufacturing and installer jobs. Now, in Spain, Italy, and France similar gains are also being made. Solar would get going very quickly if the United States had the same feed-in tariff as Europe. There would be an explosion in the industry. A feed-in tariff basically guarantees anyone who creates renewable electricity that they will be paid roughly between 30 and 40 euro cents [42 to 56 U.S. cents] per kilowatt-hour. That has allowed many projects to be financeable.

The Japanese have several big companies that have been focusing on solar for some time, like Kyocera Corporation, which exports solar panels to the United States and Europe. Japan is reconsidering its feed-in tariff. They went away from it for a number of years, but are now considering implementing it again as they consider what to do about global warming. And there are many Chinese players. Suntech Power Company is a major exporter to Europe and the United States. They are one of the largest solar companies in the world and they have been very successful in driving down the cost of solar modules. We are one of their suppliers.

Just to give you an idea of what's happening, in 2008 in the United States there were about 300 megawatts of solar installed. Across Europe, there were nearly 4,000 megawatts of solar installed.

So what do we have to do to catch up? There's been a lot of venture capital investment, but we really have to provide incentives so that manufacturing of these devices is created in the United States. The American Recovery and Reinvestment Act [the so-called stimulus plan] does include a manufacturing tax credit, but its terms have yet to be established and the amount of money set aside for it is relatively small.

S+B: Is it purely a question of what the government should do or does the private sector also bear some responsibility?

SPLINTER: Private-sector companies like ours are going to invest huge amounts in R&D and in developing the next generation of technology. We are investing more in R&D than any other company — and the U.S. government — in the solar field. We are making a huge bet that we will be able to drive the cost down.

If I have a fundamental concern, it's whether we'll have large-scale manufacturing in the United States. If we do only research and development in the United States, we'll have a hollow industry here with all the manufacturing jobs going elsewhere. Those are great jobs for factory workers and engineers and managers. And they're long-term jobs — they will be around for 20 years or longer.

Venture capitalists have invested a huge amount in solar in the past few years, but the financial crisis has created difficulties. There's also been huge volatility in energy prices. In early 2008, gasoline was nearly $4 a gallon, oil was at $150 a barrel, and natural gas prices were 100 percent higher than they are today. Reductions in cost can profoundly affect the financial community's view of renewable energy and what they're willing to support.

In view of that, there has to be demand creation, and because renewable energy still costs more than fossil fuel energy, the government has to create the market. If the private sector creates the technology and drives down cost and government creates the market, we will have a chance to solve environmental and climate issues. I certainly think we can catch up and even take the lead in solar, because innovation is the core of our culture. +

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