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### **Expansion across the Pond**

**German solar companies are striving to go abroad and consider the United States to be an attractive market. The sun-blessed regions are especially promising. In Tucson, Arizona, the sun shines 300 days a year.**



*In Southern Arizona where Saguaro cactuses rise up to the sky solar industry is flourishing.*

In Solon's assembly plant in Tucson, the glass panels sized 1 x 1.70 meters are being washed. Again and again they are closely examined, as the glass to which the solar cells are affixed has to be flawless, explains Solon production manager Bryan von Holten. A minor scratch may render the completed solar collectors unusable. Each one of the flat solar power stations, which can be mounted on rooftops or attached to racks, produces 375 watts.

Solon, one of the leading German manufacturers of solar modules, has not only come to Tucson because of the blue sky and the many hours of sunshine, says CEO Olaf Koester. "The infrastructure is very good here. We have direct access to California, which is still the largest solar market in America," he says. The states around Arizona, in the Southwest of the United States - New Mexico, Nevada, Utah and Colorado - all have very strong solar programs. The market is growing in and around Arizona. For Solon, it was the most desirable location.

### **German solar companies are welcome in Arizona**



*The Germans are welcome in Tucson, Arizona.*

Congresswoman Gabrielle Giffords, who represents Arizona in the House of Representatives, is pleased about the influx from Germany. She is a strong supporter of solar industry in Washington. The whole of the United States can learn a lot from the way Germany deals with the solar industry, she says. "In fact the best place for solar in Germany is only about as good as the worst place for solar in

the United States. When some people tell me that I am only so enthused about solar power because I come from the sun-blessed Southwest, I always refer to Germany." Giffords believes that the whole of the United States could use solar electricity, even in places such as Alaska, where the sun doesn't shine that much.

Her wish is that Arizona takes the lead in developing the necessary technologies and recruits the best and most intelligent minds. Paul Bonavia, President of UniSource Energy Corporation, which is responsible for Tucson's electric power supply, adds that German solar technology is highly esteemed: "We have great confidence in the technological leadership of German companies. Solon is a good example for a successful marriage between German technological development and leadership skills with manufacturing in southern Arizona."

### **Arizona, where the sun shines 300 days a year**



*Grand Canyon and new Skywalk*

Arizona in the southwest is the ideal state for transforming solar power into electricity. The sun shines 300 days a year. In the south near Tucson, and not far from the Mexican border, Saguaro National Park with its huge cactuses attracts many tourists. The state is home to wildlife such as coyotes, hummingbirds and rattlesnakes. You can watch breathtaking sunsets from anywhere in Arizona.

It's surprising that more solar power hadn't been established earlier in Arizona. California, Florida, Texas and even New Jersey have got much farther in this field. In Arizona, the first state-run development schemes have only just been passed. The goal: By 2025, the share of renewable energies in the production of electricity has to be 15 percent. This can only be the beginning, says Joe Snell, President of Tucson's economic development agency, TREO. He admits that it has taken quite a while for Americans to jump on the renewable energy bandwagon. Finally, he says, the high price of gasoline and the economic crisis have been their reasons for rethinking.

### **Tucson – the preferred location for German solar companies**

The German solar industry has discovered that the market in the United States is growing, and in addition, politics has woken up. During the last 18 months alone four German companies have settled down in Tucson, says Snell.

Solon has been there for a little longer. Everything started in 2006 when Solon made an investment in Global Solar, a producer of solar cells. In 2008 Solon decided to establish its own plant in Tucson. Production started in May of the same year.

### **All beginnings are difficult – even for Solon**

Koester had to learn then, that many things are done quite differently in the United States than in Germany, even when the products are the same. In 2004 Koester built a Solon plant in Greifswald, East Germany. However this experience, he says, wasn't helpful in all situations. "I was the first employee of Solon here," says Koester. "Although I had a job and wanted to make an investment of almost \$15 million, I couldn't get credit as CEO of the company."



*Olaf Koester suffered from a "credit crunch" at the beginning.*

It took half a year until Koester was considered creditworthy by the banks. He also found out that he couldn't expect as much from the workers as he had been able to in Germany: "There's no vocational training in the classical sense for machine fitters, mechatronics fitters or office administrators. Everything is based on showing the employees the ropes. This works quite well as long as no complex problems come up."

Sometimes the emergency service is needed in the middle of the night because the machine doesn't work. In the end it just hadn't been plugged in. Workers earn much less than in Germany. They are not used to thinking in more complex dimensions and often are afraid to take matters into their own hands, says Koester.

### **A lot of manual labor**

Because of the low pay, many jobs are carried out manually at Solon: starting with the soldering of connections between the individual solar cells through to wiping off superfluous silicone from the completed solar collectors. "We have automated when quality is increased, when manual production is not possible and when the production flow is optimized. But certain jobs don't require automation," says Koester.



*Schletter also settled down in Tucson – where it produces mounting systems for solar collectors.*

Foreign companies are welcome in Tucson. Their payment is 17 percent higher than those from local companies, explains Joe Snell. Ed Grover is pleased with his job at a German company. The 57-year-old designs mounting systems for solar collectors at Schletter, and is also responsible for marketing. "Basically we have more freedom to make our own decisions and still everything fits well together in the end. Nobody says: This is not my job," says Grover.

### **Economic stimulus package helped solar sector**

Schletter, a renowned German company with over 1,000 employees worldwide, settled in Tucson in February 2007. Production started in August 2007. Meanwhile, the production plant has become too small to accommodate the 85 employees and growing orders. Says sales manager Sven Kuenzel: "Recently we had three major orders and we needed to leave things in the courtyard. We had to move everything around five times."

After the government in Washington passed the economic stimulus package, many customers no longer hesitated and placed their orders. Solon as well as Schletter makes a point of taking on employees from the area, says Kuenzel. The esteemed technical know-how of Germany and the creation of jobs in the region make a strong case for sales. The pay in the United States is still well above the low wages in China, the aspiring competitor on the solar market. They are still on a

competitive basis, believes Kuenzel. And drastically cutting wages is completely out of question. "We believe that anyone working with us should be able to afford a normal life," he says.



*Sven Künzel is sales manager at the Schletter subsidiary in Tuscon*

There is no question that China with its low wages and high national subsidies causes the German and American solar industries to worry. For Tim Teich, Vice President of Sales and Marketing for Global Solar, the situation is clear: "It's a racing duel. I can't be sure who will win. But if you ask me, we will be the winners."

### **Flexible as plastic film**



*Solar collectors can be used for many purposes. Here they provide the light for the parking area of the Arizona-Sonora Desert Museum*

Global Solar – of which Solon owns a 19 percent share; the remaining 81 percent belongs to a German investment company that wants to remain anonymous – relies on thin film technology. It is with its solar cells, as flexible as a piece of plastic film, that Solon is able to produce its glass solar collectors, but the solar cells can also be integrated directly into roof tiles. "We are working on a solution in order to integrate the technology directly into the components used for constructing houses," Teich says. He strongly believes that in ten years' time solar cells on rooftops will be standard.

What is certain: Solar technology has a lot of potential for innovation, even when the basic principle remains the same. Therefore the University of Arizona has its own Research Institute for Solar Energy, AzRise, that researches how solar electricity can be produced as efficiently as possible. The researchers are looking for cheaper materials that pollute the environment less.

According to AzRise, solar collectors will soon be available that can simply be thrown away after usage. But above all, they are looking for storage solutions to provide solar electricity at night while keeping energy loss as low as possible. For even in the sun-blessed state of Arizona the sun goes down at night. According to Ardeth Barnhart, Co-Director of AzRise, it is very important to get rid of the prejudice against solar electricity:

"Real estate companies have only just started to deal with solar electricity as an issue," she says. "At first they thought it would drive up their costs so much that an investment would not pay out. Now they can see that it will increase the value of the houses in the longer term. And now they are finding out how they can equip them with solar collectors. I think that the solar sector will grow in Arizona in the next years."

## No blackouts with solar power plants



*The outdated power grid in the United States leads to frequent blackouts*

There is still another reason that makes solar electricity generally more attractive in the United States: the completely outdated power grid. In the past few years, power outages have become more and more frequent. In 2003, millions of people in the Northeast of the USA and Canada were left in the dark for hours. Electrical blackouts were the reason: overhanging trees had caused voltage fluctuations in the electric network, which led to safety shutdowns. Other power grids that were meant to take over also broke down, leading to a chain reaction. In the USA, power is mostly transmitted through overhead power lines over long distances. Not only falling trees but also freezing rain or storms can become a problem. Everything is different with solar electricity, explains Solon CEO Olaf Koester:

"Power is always fed locally. Thus the electric network is not stressed by a huge power plant established hundreds of kilometres away from the power consumer. In this case, much stronger transmission lines are required. And when many small solar power plants are installed locally no money is needed to extend and stabilize the power grid."

### **"Environment-friendliness stops when it comes to spending extra money"**

This is good news for German companies like Solon and Schletter that rely exactly on this trend. However, due to low electricity prices of about 10 cents per kilowatt-hour, many house owners still hesitate to invest in solar collectors. And at least in Arizona, electricity from solar power plants is still more expensive than conventional electricity from coal-fired power plants. Olaf Koester: "Certainly everybody wants to be green and environment-friendly. But environment-friendliness stops when much, much higher electricity prices have to be paid. Then it's easier to buy an energy-saving lamp for five dollars in order to be environment-friendly."

Thus solar electricity is only attractive to consumers if it saves money. The decisive impetus can come not only through continuous technical development, but also through financial incentives by the state. This is what experience has shown in Germany.

Author: Christina Bergmann  
Editor: Zhang Danhong

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