

China Aims to Clean Up in Solar Power

Its environment is a world-class mess, but the mainland has ambitious plans to use and produce solar power cells and panels

by [Chi-Chu Tschang](#)

China is home to some of the most polluted cities on the planet and likely will overtake the U.S. as the biggest emitter of greenhouse gases by the end of the decade. Yet while China's "dirty dragon" image is well-deserved, Beijing officials are also deadly serious about investing in solar power capacity at home and eventually becoming a dominant player in this rapidly-emerging, clean energy technology.

Consider that some 1,100 solar panels are being installed over the curved roof of Beijing's National Indoor Stadium, ahead of the 2008 Summer Olympics. In October, SunTech Power ([STP](#)), based in the old industrial city of Wuxi in Jiangsu Province will begin installing a 130 kilowatt solar energy system in the main venue of the games—Bird's Nest Stadium. Beijing has also been installing solar powered streetlights throughout the Olympic Village as well as in less urbanized areas of the Chinese capital's suburbs.

This isn't just environmental posturing, but a serious and sustained push to diversify China's energy mix, local officials contend. Beijing has pledged to install three megawatts of solar power for the 2008 Olympics. However, "If you add up all the solar energy investment in the Olympic Village, National Indoor Stadium, Bird's Nest, and rural villages, it is entirely possible that Beijing could have six megawatts by 2008," says Zhu Wei Gang, a vice-president with Beijing Corona Science & Technology, the company which is installing the solar panels in the National Indoor Stadium.

Ambitious Goals

China's worsening environmental mess (acid rain and water pollution are rampant, too) and an alarming dependence on imported oil have prompted Chinese President Hu Jintao's government to set some ambitious goals for solar power. Last year, China's solar power consumption was less than 10 megawatts, a tiny fraction of the country's total electricity consumption of 2.83 billion megawatts. By 2010, though, China hopes to be generating and consuming about 300 megawatts of solar energy, roughly equivalent to what Japan, the world's second largest consumer of solar energy, used last year.

Getting there, however, will be a stretch. China's domestic solar power industry is a work in progress. There are more than 150 Chinese companies that make photovoltaic cells that convert light into electricity, accounting for a third of the world's solar cell production. Yet the industry is heavily reliant on overseas supplies of polycrystalline silicon, or polysilicon, a key material used in solar cell production. And since demand for alternative energy has been low at home until recently, Chinese solar cell makers export 90% of their products to Germany, Japan, the U.S. and other countries.

There are compelling reasons for China to build up its own industrial solar energy capacity. The global market for solar panels and cells has been growing at a 38% compound annual growth rate since 2001. Demand is so brisk that there is now a serious shortage of polysilicon. In fact, prices for the material have jumped tenfold, to \$200 to \$300 per kilogram, since 2003.

"Foreigners Have Power"

If China developed a robust domestic market for solar power, it could shift the solar industry's balance of power, from the West and Japan to the Middle Kingdom. Just as the focal point of global TV and personal computer manufacturing has shifted to China, solar panel and cell production could be next, some argue. "If the domestic Chinese PV (photovoltaic cell) market starts to develop that would pretty much be the nail in the coffin for other countries because then not only will the cluster be here, but the [lower] manufacturing cost will be here," figures Timothy Chang, managing director of Citigroup Venture Capital China.

Still, given the anxiety other countries already have about Chinese export prowess, some governments may want to keep mainland-made solar cells out of their markets.

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"Right now, China's solar industry relies on foreign imports for its raw materials and exports most of its finished products overseas," said Meng Xiangan, secretary general of the China Solar Energy Society. "The foreigners have, in their hands, the power to direct which way our solar industry is heading."

For instance, German Chancellor Angela Merkel is steering her country toward a policy of reducing its reliance on imported energy—and that includes "made in China" solar cells. "The German market continues to be the largest market in Europe. Its growth, however, appears to be slowing down over time," said Kevin Wei, chief financial officer of Shanghai-based SolarFun Power Holdings ([SOLF](#)).

Polysilicon Monopolists

Another huge obstacle to China's solar power industrial ambitions is the current shortage of polysilicon. Seven companies—including Germany's Wacker Chemie ([WKCMF](#)), Mitsubishi Materials ([MIMTF](#)), Sumitomo Titanium ([SMOEF](#)), and Renewable Energy Corporation ASA—hold a monopoly over the world's polysilicon supply.

Chinese solar cell makers have to pay dearly for the stuff, which has somewhat undercut their huge labor cost advantage. "Access to polysilicon serves as barrier to growth and entry for many Chinese companies," says Sanjeev Chaurasia, vice-president with the Credit Suisse's Energy Group. "If they have unfettered access to polysilicon, they'll be able to compete on cost and not necessarily on access to raw materials," she adds.

China is now trying to level the playing field by developing its own polysilicon supply. At least 11 new polysilicon projects are in the pipeline. China hopes to be able to produce 12,660 tons of polysilicon and break its dependence on foreign supplies by 2011, according to THT Research.

Little Incentive to Invest

However, whether these Chinese polysilicon suppliers can actually produce so much polysilicon remains to be seen. "It can be a problem to obtain the technology. Foreign technology suppliers are not so willing to sell them know-how and technology," points out Frank Haugwitz, a technical consultant with German Agency for Technical Cooperation. Chinese polysilicon suppliers have been using Russian technology to make polysilicon but have yet to replicate their German and Japanese rivals' scale of production.

Then there is the fact that Chinese power companies, which rely heavily on coal, have little incentive to invest in more expensive solar energy capacity given that electricity prices are fixed and they can't pass along the cost to consumers.

China's Renewable Energy Law, which went into effect January, 2006, ordered power companies to use a certain amount of renewable energy but failed to provide any financial incentives to do so. Beijing Corona Science & Technology's Zhu points out "The government needs to have a good policy to allow the solar industry to develop because the cost of solar power is too high right now."

Subsidies Not a Given

Chinese solar power companies have been lobbying the government to adopt a "feed-in tariff" system modeled after Germany's. Power companies would be forced to buy solar-generated electricity at a fixed rate and the government would kick in a subsidy to encourage them to use clean energy.

"There's not a big chance of such a policy coming out in the short-term," said Li Junfeng, secretary general of the Chinese Renewable Energy Industries Assn. He added that it would be difficult for the Chinese government to provide as much in subsidies as their German counterparts.

If these problems can be worked out, there is certainly plenty of demand for cleaner energy sources in the world's second biggest energy consumer behind the U.S.

So far, most of China's demand for solar power has come from government rural electrification projects in sparsely populated areas in Tibet, Qinghai, or Xinjiang provinces, where it does not make economic sense to build power stations.

Roof Panel Push

However the real growth in China's solar power market will continue to come primarily from these rural, off-grid, solar projects. China still has 30 million people—30,000 villages—with no access to electricity. German government official Haugwitz predicts that 180 megawatts of the new solar power in the coming years will be set up in these rural areas.

In addition, some local governments in high-power-consuming urban cities in coastal China are starting to encourage the use of solar energy. Right across the border from Hong Kong, the southern metropolis of Shenzhen now requires all new buildings 12 floors or higher to install solar water heaters on their rooftops. Experts predict that one-fifth of all rooftops in Shenzhen will be covered with solar panels by 2010.

Shanghai has announced plans to invest 10.5 billion yuan to install solar panels on top of 100,000 rooftops by 2015. The Shanghai municipal government will start by subsidizing half of the cost and gradually reduce subsidies as the price of solar panels drops.

Chi-Chu Tschang contributed this article to BusinessWeek Online from Beijing.

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