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Toledo Finds the Energy To Reinvent Itself

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By JIM CARLTON

TOLEDO, Ohio -- This city became famous in the last century for being one of North America's leading glass centers. The industry has been in decline since the 1980s, but Toledo hopes to be known for its glass again. This time, though, the glass is being coated with thin layers of chemicals to produce ecofriendly "solar cells."

Toledo is among several old-line industrial cities trying to reinvent themselves -- sometimes based on their older industries -- to cash in on the demand for alternative energy. In 2006, solar start-up United Solar Inc. said it would open thin-film factories in Auburn Hills and Greenville, two Michigan towns hit hard by the automotive decline. And last year, a wind-generation plant began construction on the grounds of a shuttered Bethlehem Steel plant in Lackawanna, N.Y.

Industry officials say older industrial cities offer the clean-tech industry some advantages, including less community opposition to new plants. "The good thing about the Rust Belt is they want factories there," says Ron Kenedi, vice president of Sharp Corp.'s Solar Energy Solutions Group, which is based in Huntington Beach, Calif.

Recently, Norm Johnston, a former executive at Toledo glass companies, showed how Solar Fields LLC, a start-up he runs, was leveraging the old glass industry. Walking to the back of a 22,000-square-foot former machine shop in the nearby suburb of Perrysburg, he patted the blue metal casing on a 100-foot-long production line, which his company has designed to coat sheets of glass heated to more than 1,100 degrees with chemicals to make solar cells.

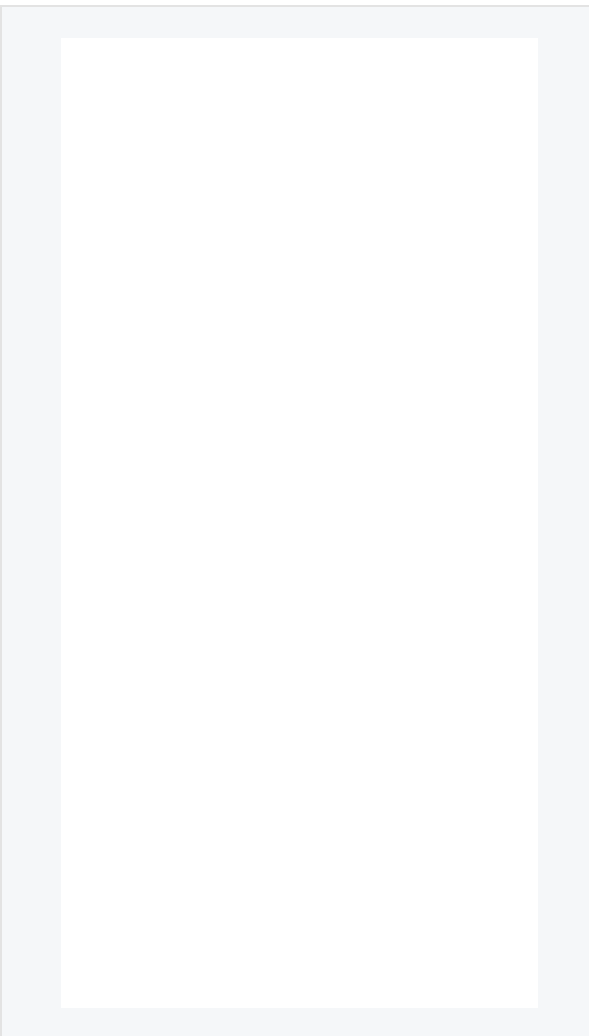


First Solar

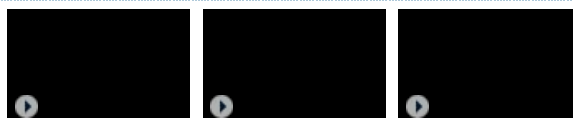
Machinery used to create solar panels at a First

"I started in glass, and now I'm back in glass," says Mr. Johnston, whose start-up has recently been acquired by German solar-panel maker Q-Cells AG.

There is similar activity at several other sites in this metropolitan area of 600,000. Companies from Phoenix-based First Solar Inc. to Xunlight Corp. are opening factories in and around Toledo to create electricity-producing "thin-film" solar panels on glass and other materials. While not rated as efficient as the more



Video



Solar plant near Toledo.

prevalent silicon-based solar cells, thin film has taken off in the last year because of soaring demand for alternative energy and a world-wide silicon shortage. It is also cheaper to make than silicon cells.

In addition to First Solar, which in 1999 built a factory in Perrysburg that now employs about 600, the University of Toledo is receiving state grants to expand its solar research and incubate thin-film spinoffs. So far, the university has incubated four solar start-ups, including Solar Fields, Xunlight, Innovative Thin Films Ltd. and Advanced Distributed Generation LLC. Toledo's Regional Growth Partnership, a nonprofit economic development group, is also using state grants to help fund solar and other alternative energy start-ups.

"I think alternative energy is one of the major hopes for northwest Ohio," says John Szuch, chairman of Fifth Third Bank of Northwestern Ohio.

In Toledo, the repercussions of the new solar activity are already being felt. Pilkington North America Inc., a Toledo-based unit of Japan's [Nippon Sheet Glass Co.](#), has become a major supplier to First Solar, offsetting some of the business it lost in the traditional glass industry. Pilkington officials estimate thin-film sales have grown to about 10% of revenue for its American building products division, prompting the company to beef up a research division that had been undergoing cuts. "It's the biggest thing going for us right now in terms of glass," says Todd Huffman, vice president of strategic planning for Pilkington.

But clean tech isn't necessarily a panacea. Only about 5,000 solar jobs have been created in the last five years in Toledo. Meanwhile, the number of manufacturing jobs lost since the 1980s is in the tens of thousands.

Cities like Toledo may also have trouble competing with domestic clean-tech hot spots like Silicon Valley, which are in closer proximity to venture capital sources. In addition, Toledo is competing against cheaper overseas locales. First Solar, for instance, is building four manufacturing plants in Malaysia. Company officials say the Perrysburg plant remains "critical" to the firm's future success.

Still, Toledo has come a long way. Stricken by manufacturing declines in the automotive and other big glass-consuming sectors, the city has been in an economic malaise for much of two decades. Its population loss in the 1990s was one of the fastest in the U.S.

Toledo acquired its Glass City moniker because of a long history of innovation in all aspects of the glass business. [Owens-Illinois](#), [Owens Corning](#), [Glasstech](#) and [Tempglass](#) have extensive ties here. As the traditional glass industry slowed, executives explored other uses for the material.

In 1989, local inventor and glass entrepreneur Harold McMaster invested some of his millions to launch one of the city's first solar start-ups. "He knew that sooner or later we would have to come up with a clean source of energy," says Alan McMaster, son of the now-deceased Mr. McMaster, an icon in the industry. Mr. McMaster's company, [Glasstech Solar](#), became [Solar Cells Inc.](#), with research facilities at the University of Toledo and in a nearby city. In 1999, Solar Cells was acquired by a private-equity firm and became First Solar.

At the time, there was little demand in the thin-film industry. In 2002, British oil giant [BP PLC](#) pulled the plug on two thin-film plants it had had in the works for more than 10 years, amid issues including technical problems, according to a January report by the Department of Energy's National Renewable Energy Laboratory.

But rising energy costs and other events -- including the blackout in the Northeast in August 2003 -- brought thin-film and other alternative energies back into favor. "We said, 'There's a business opportunity here if we had solar,'" recalls Solar Fields's Mr. Johnston. The university boosted its emphasis on thin-film research in 2001, and this year it shared in an \$18.6 million state grant to fund the solar industry.

The school is now using the money to beef up solar research in its McMaster Hall, where some labs have been packed with equipment like a magnetron gun, which is used to spray thin-film chemicals on glass and other surfaces.

Civic leaders in Toledo now say they have the ingredients in place to turn solar into a thriving



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industry. In a seafood restaurant overlooking the Maumee River one recent evening, business and academic leaders discussed the city's rising solar industry and traced back its roots. "How in the hell would we be in this business in the first place if it weren't for glass?" asked Harlan Reichle, a local real-estate executive.

Write to Jim Carlton at [jim.carlton@wsj.com](mailto:jim.carlton@wsj.com)

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