

Point of Light

Conrad Burke's Innovalight aims to solve one of the solar power market's biggest problems.

Conrad Burke, an Irish-born technologist and former venture capitalist, is out to change the economics of solar energy by slicing into the production cost of traditional crystalline silicon solar cells.

For more than 20 years solar cells have been made with rigid and expensive components such as crystalline silicon wafers or bulk silicon. Mr. Burke's startup, Innovalight, which was originally incubated at the University of Texas and the University of Minnesota, has followed a different path. It claims its solvent-based method for processing silicon nanocrystals is a breakthrough, offering manufacturing and performance advantages over current bulk-silicon technology.

"Some 90 percent of solar cells are based on crystalline bulk silicon and there has been no sign of a breakthrough leading to a next-generation technology," says Mr. Burke. "We think we have come up with unique ways to do that."

Mass uptake of solar energy hasn't happened in part because production costs are so high. Innovalight's silicon nanoparticles don't need expensive semiconductor equipment—they can use existing "roll to roll" equipment used for printing paper or film, offering substantial cost advantages, says Mr. Burke, who won't be more specific. Mr. Burke, who holds a master's degree in physics from Trinity College in Dublin, has accumulated 16 years of experience guiding semiconductor and optical component technologies into the commercial market and has worked with large and small companies in the United States, Europe, and Asia.

Another problem with current technology is that bulk silicon cannot efficiently capture all solar wavelengths. Innovalight's nanocrystals can tune the absorption characteristics of silicon, capturing more of the sun's radiation and generating more energy compared to the bulk silicon process.

Innovalight, which has received research grants from the U.S. Department of Defense, U.S. Department of Energy, and the National Science Foundation, claims that its technology has flexible properties that make its power potentially portable. Today, U.S. troops carry up to 180 pounds of material, including electronic gear and batteries. Innovalight's technology, says Mr. Burke, could one day make possible a portable generator similar in feel and weight to a sheet of fabric, which could be unraveled to charge up devices. Consumers could in theory use embedded solar power in their jackets to power their MP3 players or mobile phones.

"That is the long-term promise," says Mr. Burke, who began his career in 1989 as a research engineer at NEC in Japan before moving on to AT&T in 1992. He joined Lucent Microelectronics Group in 1996, and in 2000 he moved to OMM, an early-stage company that develops optical switching subsystems. Beginning in 2003, he started to try his hand as a venture capitalist at Sevin Rosen Funds in Palo Alto, California.



PHOTO BY DAVID WALDORF

Conrad Burke gave up life as a VC to return to the solar cell market.

Earlier this year, Innovalight's potential lured Mr. Burke back into the role of a hands-on technologist and manager.

For now, Innovalight is targeting the solar cell market, which it estimates is between \$5 billion and \$7 billion. The company is targeting the \$1-billion portable power market and plans to move into rooftop solar systems as the technology evolves, says Mr. Burke.

Besides offering compelling performance and economic benefits, Innovalight's technology also provides environmental advantages, he says. The European Union and Japan are now in the process of banning cadmium, which is used in most conventional solar cells. Innovalight's nanocrystals use only nontoxic materials.

"Today there is a huge dependence on fossil fuel-based solutions," says Mr. Burke. "The sooner other solutions become cheap enough and... lead to massive widespread adoption, the better it will be for the environment." Not to mention Innovalight's bottom line. **RFI**

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