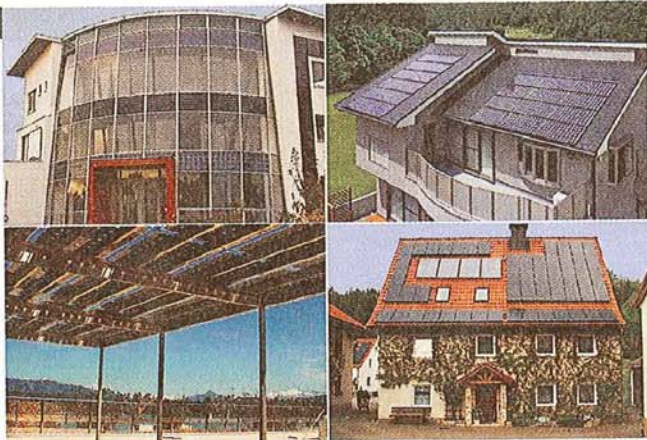


con for solar cells, launched SunPower in 1991 with a few backers. For many belt-tightened years, the company got by with research-and-development funding from government agencies and the Electric Power Research Institute. It made a solar-powered race car for Honda in 1996 and solar cells for a NASA unmanned aircraft in 1998. Both projects were successful but too expensive to result in commercially feasible products.

By 2001, the company was so cash-strapped that Swanson planned to lay off half his four dozen employees. Financiers he approached were wary: the venture capitalists "were still smarting from the demise of the dot-coms." But one Valley veteran, T.J. Rodgers, listened. Rodgers, MS '72, PhD '75, had founded Cypress Semiconductor in 1982 to make computer chips, and he remembered his classmate Swanson, whom he calls "a brilliant technologist." Rodgers remembers thinking, when Swanson approached him, "The time for solar energy has arrived."

Cypress invested \$8.8 million in Sun-



A LIGHTER LOOK: SunPower panels are integrated into buildings throughout the world.

Power for a 44 percent stake in the company that later was increased to a majority interest. By 2004 the company's new A-300 cell design had brought the cost of solar energy down to under \$10 per watt, in part because putting the wiring on the back of the cell maximized the cell's working surface and made automated production easier. SunPower's manufacturing takes place at a plant in the Philippines.

The solar equipment market is projected to jump tenfold from \$1 billion in 2010 to \$10 billion by 2020, Swanson says. While this makes for heady times for SunPower, Swanson recognizes the challenges

ahead. The firm faces global competition from such giant companies as BP, Shell, Sharp and Sanyo. A shortage of silicon is complicating the task of keeping costs low. Jesse Pichel, an industry analyst at Piper Jaffray, said SunPower is positioned to handle this better than competitors because its cells use about 30 percent less silicon per watt than the industry average.

Rhone Resch, president of the Solar Energy Industries Association, in Washington, D.C., says

Swanson has become a legend within the solar power industry for his contributions to the field. Swanson, however, does not plan to rest on his accomplishments. His "grand vision," he says, includes building the technology for immense "solar farms," located in deserts, that would run huge panels of highly efficient solar cells. He thinks such installations in Arizona and California's Central Valley could provide most of the energy needed by Sunbelt cities. "It could happen in the next 50 to 100 years." ■

DONNA ALVARADO is an editor at the San Jose Mercury News.

HERE COMES THE SUN'S NEWEST FACTORY

There hasn't been much new Bay Area manufacturing in recent years, but Palo Alto-based Nanosolar wants to change that. The privately held company plans to build a factory that will produce solar cells to generate 430 megawatts of electricity a year—enough to power 325,000 homes—making it the largest factory of its kind in the world.

"Manufacturing the cells in the Bay Area close to our [research and development team] gives us a huge cost advantage," says Nanosolar CEO Mark Roscheisen, MS '95, PhD '98. "It vastly outweighs the benefit of building in a location where labor is cheaper."

Scheduled for completion in late 2007, the factory will employ several hundred individuals. A site in San Francisco, San Jose or Santa Clara will be announced in January.

After selling several Internet companies, Roscheisen co-founded Nanosolar in 2001 with Brian Sager, PhD '94, using seed money from Google founders Larry Page, MS '98, and Sergey Brin, MS '95, PhD '98. Says Roscheisen: "Financing was very difficult to obtain [at that time]; the venture capitalists had never funded a solar cell company before us. Today, just four years later, a lot has changed." By October 2006, Nanosolar had secured a total of \$148 million in funding.

Much of the investors' change of heart can be traced to an innovative technology that Nanosolar claims will lower production costs dramatically and make mass-production commercially viable. Photovoltaic cells are printed directly onto a flexible film using a copper alloy, which generates electricity by absorbing light. The increasingly expensive use of silicon as a semiconductor material is circumvented, so the cells can be produced at about one-fifth of the normal cost. If Nanosolar's factory reaches its annual output goal of 430 megawatts, the nation's solar manufacturing capacity will be tripled—the combined capacity of solar cell factories in the United States generates only 153 megawatts.

Nanosolar isn't the only company pursuing the technology that one tech blogger calls "solar's holy grail." Santa Clara-based Mia-solé is also pursuing the thin-film method, and other companies are racing to develop even cheaper techniques.

"These days, clean energy is a space of great entrepreneurial opportunity, and solar in particular will benefit from new technology," Roscheisen says. "[But] I remember when it seemed as if I'd be the only entrepreneur in Silicon Valley to pursue this."

—Marie Cannizzaro, '06