

Solar on the Water



Peter DaSilva for The New York Times

Elvin Batz, an installer at SPG Solar, checks the pontoon structure and panels of a floating solar array in an irrigation pond in Petaluma, Calif.

By TODD WOODY
Apr. 19 2011

PETALUMA, Calif. — Solar panels have sprouted on countless rooftops, carports and fields in Northern California. Now, several start-up companies see potential for solar panels that float on water.

The solar panel system at Far Niente Winery involves nearly 1,000 panels on pontoons and about 1,300 panels on adjacent land.

Already, 144 solar panels sit atop pontoons moored on a three-acre irrigation pond surrounded by vineyards in Petaluma in Sonoma County. Some 35 miles to the north, in the heart of the Napa Valley, another array of 994 solar panels covers the surface of a pond at the Far Niente Winery.

“Vineyard land in this part of the Napa Valley runs somewhere between \$200,000 and \$300,000 an acre,” said Larry Maguire, Far Niente’s chief executive. “We wanted to go solar but we didn’t want to pull out vines.”

The company that installed the two arrays, SPG Solar of Novato, Calif., as well as Sunengy of Australia and Solaris Synergy of Israel, are among the companies trying to develop a market for solar panels on agricultural and mining ponds, hydroelectric reservoirs and canals. While it is a niche market, it is potentially a large one globally. The solar panel aqua farms have drawn interest from municipal water agencies, farmers and mining companies enticed by the prospect of finding a new use for — and new revenue from — their liquid assets, solar executives said.

Sunengy, for example, is courting markets in developing countries that are plagued by electricity shortages but have abundant water resources and intense sunshine, according to Philip Connor, the company’s co-founder and chief technology officer.

Chris Robine, SPG Solar’s chief executive, said he had heard from potential customers as far away as India, Australia and the Middle East. When your land is precious, he said, “There’s a great benefit in that you have clean power coming from solar, and it doesn’t take up resources for farming or mining.”

Sunengy, based in Sydney, said it had signed a deal with Tata Power, India’s largest private utility, to build a small pilot project on a hydroelectric reservoir near Mumbai. Solaris Synergy, meanwhile, said it planned to float a solar array on a reservoir in the south of France in a trial with the French utility EDF.

MDU Resources Group, a \$4.3 billion mining and energy infrastructure conglomerate based in Bismarck, N.D., has been in talks with SPG Solar about installing floating photovoltaic arrays on settling ponds at one of its California gravel mines, according to Bill Connors, MDU’s vice president of renewable resources.

“We don’t want to put a renewable resource project in the middle of our operations that would disrupt mining,” Mr. Connors said. “The settling ponds are land we’re not utilizing right now except for discharge and if we can put that unproductive land into productive use while reducing our electric costs and our carbon foot print, that’s something we’re interested in.”

Mr. Connors declined to discuss the cost of an SPG floating solar array.

But he noted, “We wouldn’t be looking at systems that are not competitive.”

SPG Solar’s main business is installing conventional solar systems for homes and commercial operations. It built Far Niente’s 400-kilowatt floating array on

a 1.3-acre pond in 2007 as a special project and has spent the last four years developing a commercial version called Floatovoltaics that executives say is competitive in cost with a conventional ground-mounted system.

The Floatovoltaics model now being brought to market by SPG Solar is the array that bobs on the surface of the Petaluma irrigation pond.

“We have been able to utilize a seemingly very simple system, minimizing the amount of steel,” said Phil Alwitt, project development manager for SPG Solar, standing on a walkway built into the 38-kilowatt array.

“With steel being so expensive, that’s our main cost,” Mr. Alwitt said.

Long rows of standard photovoltaic panels made by Suntech, the Chinese solar manufacturer, sit tilted at an eight-degree angle on a metal lattice fitted to pontoons and anchored by tie lines to buoys to withstand wind and waves.

The array, which is not yet operational, will be hooked up to a transmission line through a cable laid under the pond bed. Mr. Alwitt said that when the array is completed, 2,016 panels would cover most of the pond’s surface and generate one megawatt of electricity at peak output.

He noted that the cooling effect of the water increased electricity production at the Far Niente winery by 1 percent over a typical ground-mounted system.

SPG Solar executives said an environmental engineering firm that evaluated its technology concluded that water evaporation under the floating arrays decreased by 70 percent. The companies also say that their systems inhibit destructive algae growth by blocking the sunlight the algae need to grow.

David L. Sedlak, a professor of civil and environmental engineering at the University of California, Berkeley, agreed that the floating solar power plants could prove useful in controlling algae.

“Irrigation ponds have the potential to become algal sources and algae can cause all sorts of issues,” said Dr. Sedlak, co-director of the university’s Berkeley Water Center. But he said he doubted that stemming evaporation would be a big selling point for floating solar panels since irrigation ponds did not lose that much water to evaporation.

Solar entrepreneurs had hoped to persuade the California State Water Project to cover the 400-mile California Aqueduct with photovoltaic panels. The panels could then generate electricity in the canal that irrigates the agricultural empire of the Central Valley and helps supply water to 25 million Californians.

Solaris Synergy, the Israeli firm, claims that installing its floating solar arrays on the aqueduct could produce up to two megawatts of electricity per mile. And SPG Solar executives said they held preliminary discussions with state officials about putting solar panels on the aqueduct.

“We think there’s a huge potential,” Mr. Robine said.

Ralph Torres, deputy director of the state water project, said he had recently spoken with Solaris, the latest of many companies that he said had approached his agency over the years about installing solar panels.

“You would really have to anchor these solar arrays so they wouldn’t float away,” Mr. Torres said. “If you do spring a leak and have to go in quickly these panels would be in the way and you might damage or destroy them when responding to an emergency.”

“A better application would be on a reservoir,” he added.

That is Sunengy’s strategy. Mr. Connor said the company was looking to developing countries to turn hydroelectric dams and village reservoirs into giant batteries.

“Any solar power you generate on the dam allows you to feed the transmission line and save water in the dam for use on rainy days or at night,” he said.

Sunengy’s plan would deploy rafts of solar units that use a plastic lens to track the sun and concentrate sunlight on small photovoltaic cells that use less expensive silicon than conventional cells. In high winds, the lens stows under the water.

“If you have a drought on a hydroelectric dam, your asset is dead,” Mr. Connor said. “If you have solar power on that dam, you can continue to generate electricity.”