

Solar Array

Proves Bright Idea

By Anne Wallis Haynie

Controlling energy costs with a power purchase agreement

As energy costs rise at annual rates exceeding 5% in many markets, renewable power is becoming the environmentally friendly alternative.

In conjunction with a recent improvement project, the city of San Diego's historic Alvarado Water Treatment Plant (AWTP) has installed a 1.135-MW solar array that provides about 20% of the plant's total electric load from the clean, renewable energy of sunlight, while offering a hedge against future energy cost increases.

AWTP, which began operation in January 1951, provides drinking water to more than 500,000 residents. The plant's current capacity of 120 million gal per day (mgd) will increase by 67% to 200 mgd when an upgrade and expansion project is completed in 2010.

Adopting a Power Purchase Agreement

To alleviate the cost of such a vast expansion, the city of San Diego became one of the first in the nation to adopt a power purchase agreement (PPA)—a contract between an electricity generator and a host site

owner that can curb energy costs in a sustainable manner.

"It's always been the policy of the city of San Diego to be environmentally sensitive in a way that makes economic sense," said John Helminski, the city's emerging and renewable

technology program manager. "As we explored the PPA option, our bottom line was that the price of the energy produced must be equal to or less than that provided by our local utility."

Consequently, AWTP receives electricity from 6,128 Kyocera KC200GT solar modules that it hosts—but does not own—atop its concrete water tank lids. The PPA provider owns, operates and maintains the entire solar electric system. For a period of 20 years, the city of San Diego has agreed to purchase every kilowatt the system produces at a fixed price, with an annual cost escalation of just 1%.

"Under our PPA, solar electricity is already costing us less per kilowatt hour than utility power," Helminski said. "Additionally, utility rates typically rise by at least 2.5% each year, which promises further savings."

Taking a conservative approach and compounding the difference between 2.5% and 1% annual rate increases, AWTP estimates savings of about \$325,000 during the course of its 20-year PPA. If rates rise an average of 4% per year, the savings will be about \$650,000.

"This agreement works very well for us," Helminski continued. "It brought a great opportunity to utilize the space on top of our water tanks, which would otherwise have gone unused. In addition, as hosts but not owners, we've agreed to purchase all power generated by the system, so it's in the owner's best interests to keep the panels and inverters clean and operable to generate as much electricity as possible."

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San Diego's historic Alvarado Water Treatment Plant (AWTP) installed a 1.135-MW solar array.

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AWTP anticipates its PPA will save the facility approximately \$325,000 over 20 years.

The Solar Movement

The system uses solar panels from Kyocera, a developer of solar energy solutions since 1975. The company was the first to mass-produce polycrystalline silicon solar cells using the casting method—now the industry standard—and its products compare well in performance, energy conversion efficiency (18.5%) and long-term reliability. It is one of the largest manufacturers of solar energy products in the California-Baja region, with a 24-acre complex in Tijuana that will soon be producing 240 MW of solar modules per year.

The modules are considered appropriate for municipalities and water treatment facilities because of their high efficiency and rugged construction, which the company backs with a warranty up to 25 years. So far, the modules at AWTP have exceeded all performance estimates, delivering 115% of the system designer's expected output since their installation in February 2007.

"Initially, we anticipated 1.6 million kWh annually," Helminski said. "It's been producing just over 1.85 million, an over-performance of about 15%."

For municipalities considering solar energy, Helminski recommends the PPA. "There's no downside for us. I don't know of a single day where there was a drop-off in power or any of the panels were not performing. It has worked flawlessly and beyond our expectations."

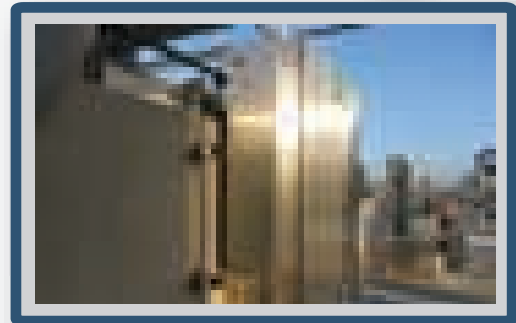
Tom Dyer, a Kyocera vice president, believes water treatment will become a mainstream application for solar power. "The two common characteristics of available space and high electrical demand make water treatment facilities a natural place to generate solar electricity on a large scale," he said. "With current incentives, even the most conservative assumptions about future utility rates make solar energy a safe and attractive investment."

Future Revenue

While San Diego's PPA is already a money saver, it may actually provide additional revenue in the future. California Assembly Bill 32 (AB32), the Global Warming Solutions

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Act, set the state's 2020 greenhouse gas emissions reduction goal into law, mandating a return to the greenhouse gas emissions level of 1990. The measures necessary to meet the 2020 target are to be adopted by 2011. Under the new law, cities must reduce their production of greenhouse gases or

purchase renewable energy credits (RECs) to offset the greenhouse gases they produce.

As a result, many agencies are now investigating solar power, and AWTP is garnering a lot of interest. About twice per month, Helminski gives onsite tours detailing his solar PPA

experience. To date, the tours have involved representatives of municipalities from Massachusetts to Hawaii.

When speaking to other municipalities, Helminski mentions that bills like AB32 and future cap-and-trade legislation have the potential to create a robust market for RECs, bringing new revenue to cities with credits to sell. The city of San Diego will be able to sell any excess RECs as a commodity to cities that have not adopted renewable energy as quickly.

With a favorable experience at AWTP already, San Diego is now pursuing solar PPAs for its other water treatment facilities. An 800-kW system is being installed at the Otay Water Treatment facility, closer to the U.S.-Mexico border, and a 500-kW system is scheduled for early 2010 in Rancho Bernardo, a North County suburb.

"We're extremely proud that San Diego leads California in both the number of solar energy installations as well as in the amount of electricity generated using photovoltaic panels," said San Diego Mayor Jerry Sanders. "Solar panels on the AWTP are a major step toward meeting our goal of 50 MW of solar power within city limits by 2013." **WWD**

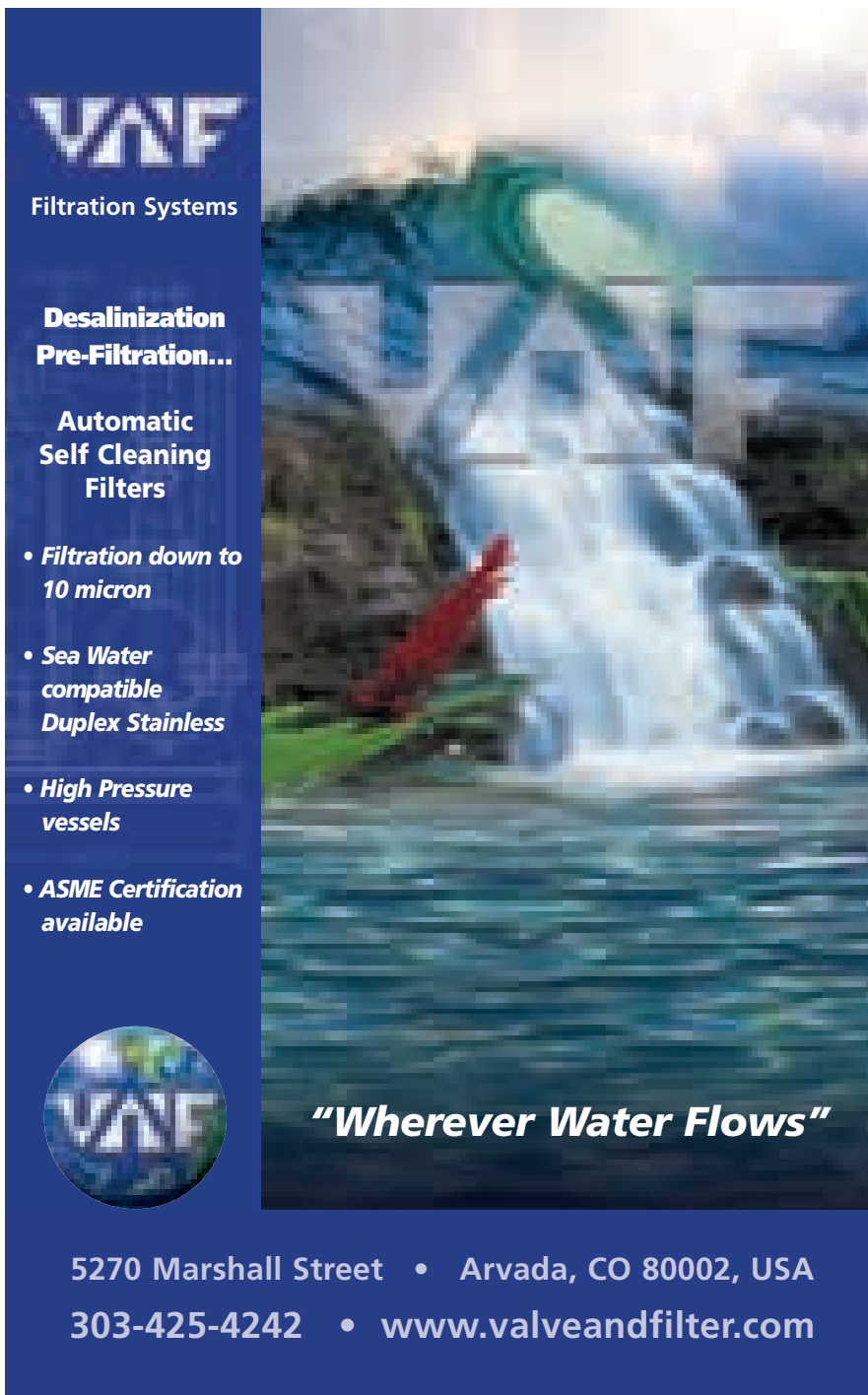
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