



This 190 kW solar array powers the influent pump station at the South County Regional Wastewater Authority treatment plant and exports surplus power to the utility grid.

Saving and Producing

A CALIFORNIA AUTHORITY GOES 'GREEN' WITH AN AERATION EFFICIENCY UPGRADE AND TWO SOLAR ARRAYS INSTALLED UNDER A POWER PURCHASE AGREEMENT WITH NO UPFRONT CAPITAL

By Steve Lund

Some clean-water plants become more sustainable by saving energy; others by producing their own. The South County Regional Wastewater Authority in California does both.

Its treatment plant serves the California cities of Morgan Hill and Gilroy and is a big recycler. The plant is rated at 8.5 mgd for secondary treatment (2017 average of 7.55 mgd) with discharge into percolation ponds. It's rated at 9 mgd for tertiary treatment to produce recycled water. Demand for the recycled water — used for irrigating parks, golf courses, and farms and for some commercial and industrial uses — is seasonal. "We were already doing a lot of conservation and recycling," says Saeid Vaziry, P.E., environmental programs manager. "The board wanted to go 'green' in energy usage." Annual 3 to 5 percent electric rate increases from Pacific Gas and Electric were a big motivator. Another was a Pacific Gas and Electric Sav-

“Basically, this allows us to have a fixed energy price for 20 years, and it really reduces our facility demand charges. There was no risk for us. Performance is 100 percent guaranteed. We just buy the power.”

SAEID VAZIRY, P.E.

ings By Design program that provides rebates for reducing peak loads and overall energy consumption.

Starting in 2014, the authority launched a major improvement program that included an upgrade of the aeration system, along with two solar energy projects that added significant generation without big capital investments.

FINE-BUBBLE AERATION

The old aeration system, with three mechanical surface aerators in each of two oxidation ditches, was beyond its life expectancy. In researching replacements, operators performed a stress test that revealed the tanks could handle more volume with more efficient aeration.

The South County Regional Wastewater Authority, Pacific Gas and Electric, and CH2M, which operates the plant, looked at various options before deciding on fine-bubble diffusion. The authority installed hybrid rotary-lobe blowers (Aerzen USA), two for each oxidation ditch to provide redundancy. The blowers deliver air to panel diffusers (Ovivo USA) by way of a custom-designed set of pipes attached to the ditch walls.

"Pacific Gas and Electric was involved all along," Vaziry says. "They had their own engineers and consultants come here and work with us. They watched the whole thing through construction and commissioning. They wanted to



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see if the system really performed as expected.” The transition went smoothly, and the new system went online in 2016.

“We have an enhanced treatment system for our needs, and we are saving energy, too,” Vaziry says. The efficiency of fine-bubble aeration exceeded expectations. Monitored from the plant SCADA system, it uses variable-speed drives on the blowers with automated dissolved oxygen control. The aerobic and anoxic sections of the ditches are still served by the old mechanical aerators, but only one per ditch, operating at much lower speeds.

The project qualified for a rebate of \$170,119, one of the largest in the Pacific Gas and Electric program. Based on an anticipated usage reduction of 1.6 million kWh per year, the rebate covered 8.6 percent of the \$1.98 million project cost.



Two hybrid rotary-lobe blowers (Aerzen USA) serve each oxidation ditch, providing redundancy.

the authority owning and operating the system, and a developer doing so with an agreement that the authority would buy the power.

Four bidders responded, and the authority opted for a power purchase agreement, or PPA, with SolarCity. The PPA advantages included the absence of capital investment and the ability to lock in a rate for the length of the agreement. SolarCity handled all design, permitting, construction, interconnection, financing, operations and maintenance.

GENERATION WITH STORAGE

The solar system includes two arrays. A 190 kW array at the plant entrance powers the influent pump station and, in fact, yields a significant excess, which is sold back to the grid. A 1 MW array can supply about 30 percent of the treatment plant's power. It's connected to a 250 kW battery package (Tesla) to supply power when the solar arrays are not generating and to provide backup in case of problems on the utility grid.

Both systems are projected to save significant money — an estimated \$6.8 million over the 20-year PPA term as opposed to utility power. “Basically, this allows us to have a fixed energy price for 20 years, and it really reduces our facility demand charges,” Vaziry says. “There was no risk for us. Performance is 100 percent guaranteed. We just buy the power.” **tpo**

ENERGY FROM THE SUN

The South County Regional Wastewater Authority officials also investigated options for producing electricity. “We looked at energy generation for the whole plant and decided solar was our only option,” Vaziry says. The next question was who would build and pay for the solar panels. The authority had land around the plant suitable for solar arrays.

“We looked at the pros and cons,” Vaziry says. “There was a lot of upfront investment with building our own plant, and we didn't have expertise to manage a solar system.” The authority sent the project out for bid both ways:

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