

# The Perfect Blend

THE PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPARTMENT MIXES RENEWABLE ENERGY INITIATIVES WITH SAVVY ENERGY PURCHASING ARRANGEMENTS TO SAVE MILLIONS

By Mike Grennier

**A** key to environmental excellence is blending green initiatives with low-cost energy where possible — and that's what the Pima County (Ariz.) Regional Wastewater Reclamation Department (PCRWRD) has accomplished.

"Treatment rates are one of the most important issues for our users, and if there's any opportunity to reduce our costs we'll definitely do it," says deputy director Jackson Jenkins. The department operates two activated sludge plants and nine smaller facilities in and around the Tucson area.

The main treatment operations include the Roger Road plant (41 mgd) and the Ina Road facility (37.5 mgd). Green initiatives range from a 32-year-old combined heat and power (CHP) system to a single-axis solar tracking system. The department also found ways to purchase energy for less, saving ratepayers millions.

For Jenkins, it's all about environmental stewardship: "We live in a green world and you need to be on board with that idea to succeed in this industry."

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## LOW-COST POWER

The CHP system at Ina Road was installed in 1977 and has seven 650-kW Dresser Waukesha engine-generator sets with a 950-ton YORK (Johnson Controls) absorption chiller. Five of the units run continuously at 70 percent load, produce 2.5 MW and satisfy more than half the plant's electrical load. One unit is regularly rotated out of operation for maintenance, and the remaining unit serves as a backup. The energy from the engines also heats the digesters and helps meet the plant's HVAC, chilled water, and domestic hot water needs.

The Roger Road plant operates an engine-generator set system to meet 45 percent of its electrical load. The system has three 400-kW Waukesha units, two installed in 1979 and upgraded to a lean-burn configuration in 1996. The system powers four Hartzell odor-control fans and other equipment. At both plants, about 30 percent of the

fuel is digester gas and the rest is natural gas.

Through diligent preventive maintenance, engine rebuilds, and the proper mix of fuels, the department generates electricity for 7 cents per kWh, versus 9 cents for the lowest price of utility power. The engine-generator sets at both facilities save the department more than \$1 million per year.

## SMART PURCHASING

Besides producing on-site power, the department leverages the engine-generator sets to achieve the lowest utility power prices. The original Ina Road plant uses a high-purity oxygen activated sludge process, and the utility provides only emergency power.

The newer 12.5-mgd plant at Ina Road, built in 1997, uses all utility power for its biological nutrient removal process. The arrangement with the utility eliminates payment of a higher rate for back-up/standby power for the entire plant, saving \$800,000 per year.

In July, the department negotiated a lower rate with the utility for the Roger Road plant. It did so by dedicating the engine-generators to powering only the odor-control fans. The utility no longer provides back-up/standby power for the whole operation, saving nearly \$200,000 per year in energy charges.

To qualify for the lower utility rate and to maximize the use of digester gas, the Roger Road staff installed a boiler to heat the plant's five digesters. The Parker boiler, fueled by digester gas and rated at 3 million Btu/hr, eliminates the need to tap one of the engine-generators for digester heat. Three gas engines, fueled primarily with digester gas, also power Fairbanks-Morse biological recirculation pumps.

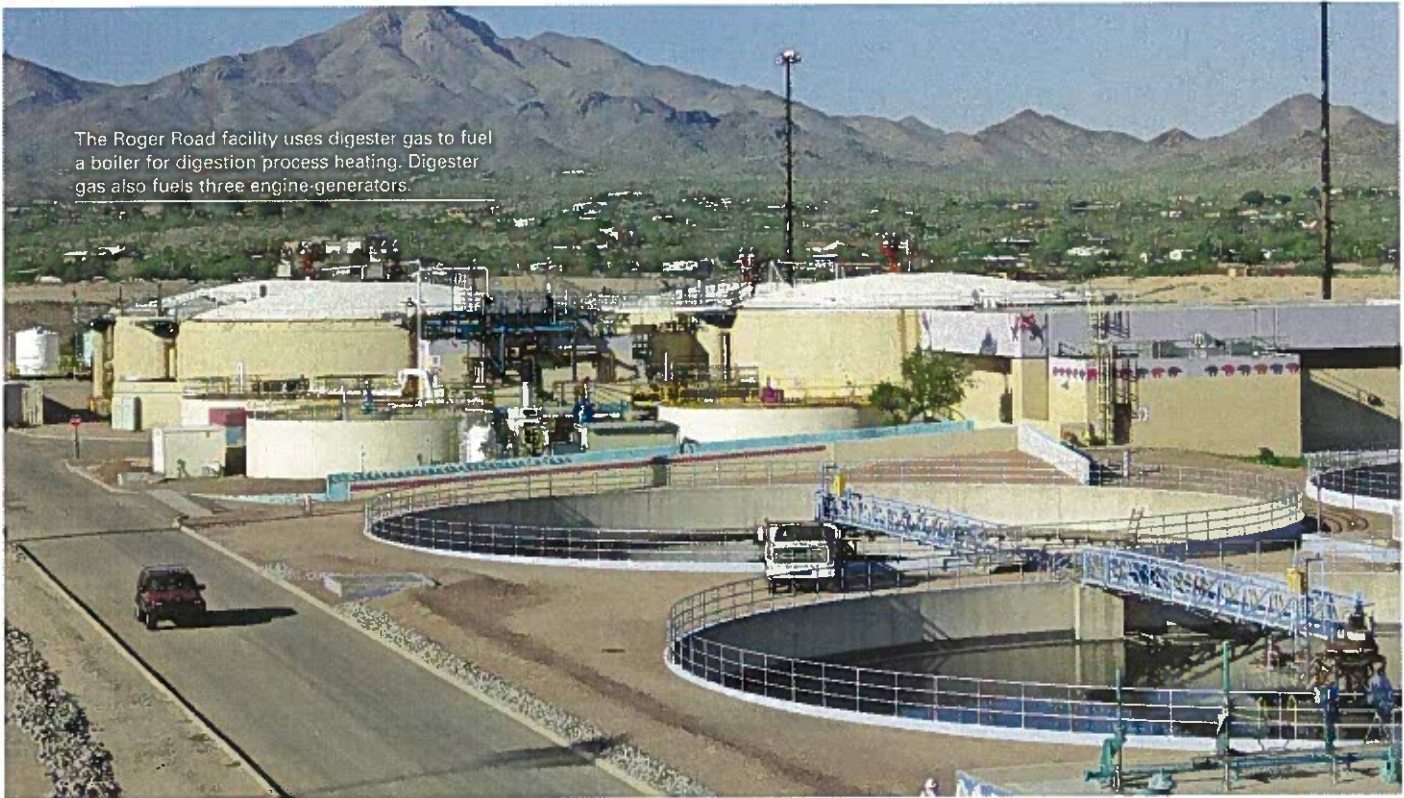
## RENEWABLE ENERGY

The use of digester gas means that 20 percent of all the energy to operate the wastewater reclamation facilities is renewable. Yet the department is working to use even more renewables through various initiatives, including a 1-MW single-axis tracking solar photovoltaic system at Roger Road.

The system, to start up in early 2010, has three freestanding arrays with 3,888 solar panels. Each array automatically tracks the sun. Through a 20-year power purchase agreement, SOLON Corpo-

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The Roger Road facility uses digester gas to fuel a boiler for digestion process heating. Digester gas also fuels three engine-generators.

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ration will operate and maintain the system and sell power to the department at a fixed rate. Ratepayers will save \$2 million over the life of the agreement.

The new solar system complements 53 individual solar panels already in place to power flow meters at pumping stations throughout the collection system. The department also began operating two wind-driven aerators earlier this year at a satellite treatment facility. The units, used on an aeration pond, replaced three electric aerators. If all goes well, more wind-driven units may follow.

**PLAYING THE MARKET**

Aside from co-generation, solar power, and wind power, the department has launched a plan to save some \$500,000 per year by buying natural gas through an independent gas transporter.

Negotiating low energy rates is all part of the plan to implement green initiatives wherever possible, while reducing energy costs. “We’re really achieving the best of both worlds,” Jenkins says. “We’re just trying to take all of these things in stride, be a good environmental steward, and run the best business we can.” tpa

**more info:**

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**Parker Boilers Co.**  
323/727-9800  
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