

Water/Wastewater Case Study:

Orange County Water District

Background

- Type of Agency: Water, wholesale
- Location: Fountain Valley, Calif.
- Size: 190 employees
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Summary

In 2001, Orange County Water District (OCWD) implemented a number of new projects to reduce energy load, save money and preserve or extend equipment life. The projects targeted office spaces, employee behavior and water treatment systems. For the past few years OCWD has operated its treatment facilities around daily energy flocculation¹ when possible. OCWD did not make improvements to its Water Factory 21 treatment facility; the facility is scheduled to be converted in mid-2003 into the Ground Water Replenishment System (GWR), an MF/RO facility designed with the latest energy-efficient equipment and processes. OCWD predicted that the GWR will save 140 kilowatt-hours (kWh) each year.

Referenced in Water/Wastewater Guides:

- #1, "Reduce Energy Use in Water and Wastewater Facilities Through Conservation and Efficiency Measures"
- #2, "Promote Energy Conservation and Efficiency Through Public Outreach, Incentives and Assistance"

Plan

Contractors ACCO, B&P Services and FM Thomas conducted an on-site pre-project inspection, which included gathering power readings from power monitors and monthly kW readings on the administration building and MWDOC building. The contractors also gathered the

1. A chemical process involving addition of a coagulant – something that causes coagulation (to thicken into a mass) – to assist in the removal of turbidity in water.

actual amps of the chillers for those buildings and recorded those on the power monitor (PM) work order through OCWD's PM program.

ACCO supplied data from water pumps and took a chemical analysis of the HVAC water systems to determine the buildup on heat transfers – the more buildup, the more energy the HVAC system needs to ensure the heat transfers work properly. ACCO recommended maintenance items on all HVAC equipment.

The associate general manager, I&E supervisor and water production superintendent headed the OCWD energy conservation and efficiency projects. The budget for the project totaled \$4,000.

OCWD's goals in 2001 were to reduce energy load, save money and preserve/extend equipment life. Its projects targeted power use in buildings' electrical/lighting systems; chemical and energy management issues concerning the plant treatment process and HVAC systems; and energy use by employees and ultimately customers. Water users' bills reflect final costs of water treatment – the more expensive the treatments, the higher the bills.

Programs: Conservation

✓ HVAC:

- Raised zone temperatures to 76 degrees F on all local thermostats except in critical locations (labs, computer equipment rooms). General management informed all employees via e-mail of thermostat changes, which took a month to implement, starting in June 2001.
- Implemented an aggressive extended preventative maintenance program on HVAC units, included optimizing equipment operational schedules
- Cleaned coils on HVAC units to make the heat transfers efficient.

✓ Lighting:

- Installed automatic light sensors in various offices and restrooms.
- Reduced lighting where possible (3 to 5 percent of total lighting in buildings).

✓ **Other equipment:** Turned off decorative water fountain and enlisted staff to turn off all office equipment, such as computers, when not in use. Conducted random walks through buildings to verify compliance.

✓ **Water pumps and systems:** Turned off high-energy demand water treatment pumps when possible.

✓ **Employees:** Kept employees abreast of all conservation efforts via e-mail from general management.

Programs: Efficiency

✓ **Lighting:** Installed energy-efficient Sylvania T8 lights where feasible.

✓ **Water pumps and systems:** Used energy-efficient pumps, periodically cleaned equipment coils and performed chemical treatment on water system boilers and chillers. The chemical treatments not only extend equipment life, but optimize heat transfer of equipment, resulting in energy savings as well.

Programs: Public Outreach

✓ **Low-flush toilet replacement program:** OCWD, the Metropolitan Water District of Orange County (MWDOC) and the Orange County Sanitation District (OCSD) replaced older toilets with 1.6-gallon-per-flush toilets, which reduces the amount of water per flush and saves water and treatment costs. This was jointly funded by OCWD, MODOC and OCSD.

✓ **Community partnerships:** In December 1999 OCWD became the major foundation sponsor of the Blue Planet Foundation, formed in 1997 for conducting research and developing and implementing community-based environmental education programs. A new board of directors was formed and the mission statement was revised to reflect the increased focus on water (primarily groundwater) conservation and protection. The new partnership between OCWD and Blue Planet is enabling the foundation to reach out further as a proactive leader in creating innovative water conservation, environmental protection and education programs.

OCWD and the Blue Planet Foundation partnered with Disneyland Resort, Metropolitan Water District of Southern California and OCWD's Groundwater Guardian Team for the nation's largest children's water education festival on May 1-2, 2001, at Hidden Valley Park in Irvine, Calif. The

festival was designed to teach elementary school children (grades 3 and 4) about the interdependence of water, soil, plants, trees, animals and humans.

✓ **Hotel/Motel Conservation Program:** Offered hotels and motels, with partners, free laminated towel rack hangers or bed cards that asked guests who spend more than one night to consider using their towels and bed linens more than once. Hotels and motels that signed up for the program received a free bilingual instructional video for use in training their housekeeping staff.

✓ **Restaurant Conservation Program:** Designed and offered, with partners, free laminated tent cards to participating restaurants to place on their tables. The cards explained to guests the restaurants' interest in helping conserve water for Orange County and that the restaurant will only be serving water on request. The program allows the guests and the restaurant to be environmentally aware while reducing water use, lowering costs and saving energy.

Budget and Finance

The budget for entire energy plan was \$17,000: HVAC projects cost \$10,000 to implement; lighting retrofits cost \$4,000, automatic light sensors cost \$3,000.

All programs (except the low-flush toilet replacement program) were financed by the General Fund.

Results

To measure results, in-house and outside consultants gathered and evaluated power readings of various areas each month, as well as the chemical analysis of HVAC water systems. In other cases, the money saved by not using high-cost electricity determined the results. Each program implemented by OCWD resulted in some savings or reduced demand. By taking a no-cost measure such as turning off its decorative fountain, OCWD saved 40,000 gallons of water in a year. The HVAC program saved \$3,000/year, lighting retrofits saved \$700/year and automatic light sensors saved \$200/year.

Overall, OCWD reduced its total electrical load by 3 percent and saved 250,000 kW and approximately \$35,000 annually with an expected payback time of less than two months.