Water/Wastewater Case Study:

Santa Clara Valley Water District

Background

- Type of Agency: Water, wholesale
- Location: San Jose, Calif.
- Population Served: 1.7 million
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Summary

In response to the energy crisis of 2001, Santa Clara Valley Water District (SCVWD) enhanced existing energy efficiency improvement programs, lowered air conditioning and lighting usage and installed backup generators and additional battery power to increase backup power capability and backup power to critical operations. SCVWD's actions consisted of four separate and district projects:

- Enhancement to existing energy planning and management program,
- Short-term immediate reliability project,
- Long-term enhanced energy management planning project, and
- Alternate energy source projects.

SCVWD also partnered with the City of San Jose to develop an outreach and advertising campaign called, "Tales From the Grid" to encourage energy and water conservation. Besides attempting to prevent rolling blackouts, the City of San Jose wanted to participate in the water conservation program to reduce the amount of treated wastewater that is released into San Francisco Bay.

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

In planning its water and energy conservation programs, SCVWD identified existing energy conservation practices, identified critical systems and components receiving electrical power, determined the duration of required operations time during loss of power from Pacific Gas & Electric (PG&E), contacted industry peers, power specialists, suppliers, engineers and regulators to poll what others were doing and conducted three focus groups for an outreach campaign.

Internal SCVWD staff collected the data through audits, surveys and face-to face discussions. An advertising firm was hired to test public outreach messages about water and energy conservation and to help implement a public outreach campaign. SCVWD also met with its retailers to assess and address Santa Clara Valley's water risks related to loss of power. Consideration was given to developing a SCVWD and retailer combined block power usage and load map.

SCVWD utility engineering, operations, maintenance, HVAC and public information staff were instrumental in carrying out the internal programs. The following actions were identified:

- White paper assessments of operations needs,
- Increase backup battery capacity for small critical systems and equipment,
- Add backup generator capacity for large critical systems and equipment,
- Lower HVAC and lighting usage, and
- Negotiate media buys, creative development and production of TV, radio, transit and print ads with advertising agency. Target Santa Clara County residents, including Spanish- and Vietnamese-speaking residents.

SCVWD's goals included:

- Continue to support SCVWD's mission of water supply and management in spite of external power interruptions,
- Provide 24-hour battery backup for SCADA instrumentation and communications,

- Provide indefinite power backup via backup generators for critical source pumping, water treatment and emergency operations, and
- Reduce HVAC and lighting use to prudent levels.

Most of the outreach planning began in March 2001, for launch by the end of June 2001. SVCWD planned to have all other conservation programs ready for implementation by the summer of 2001 and planned to convert temporary installations to permanent by the end of 2001.

Programs: Conservation

✓ **HVAC**: Raised thermostat settings two degrees during working hours in the summer and turned off the HVAC at night.

✓ **Lighting**:

- Reduced and phased off parking lot lighting each evening and weekends
- Reduced office lighting; and reduced 90 percent of outside lighting in evenings.

✓ **Office Equipment**: Encouraged employees to limit their use of unnecessary electrical energy with computers and copiers.

✓ **Employes**: Notified employees about conservation actions through e-mail announcements and small group meetings with supervisors/managers.

✓ **Alternative and/or renewable energy sources**:

- Natural gas generators: As part of the district's long-term enhanced energy management strategy, SCVWD planned to install1,000 kW natural gas generators at the Penitencia Water Treatment Plant by 2005 and at the Almaden Headquarters campus by 2003. The Almaden Headquarters generator installation will have the added feature of a heat recovery system for use with HVAC – cogeneration.
- Distributed generation: SCVWD planned to install two solar systems at the Almaden Headquarters: a 98-kW carport solar system visible from the highly traveled Almaden Expressway to serve as a centerpiece to SCVWD's commitment to the environment and a 136-kW system on top of the district's administrative building.
- Diesel generators: As a short-term immediate reliability project in 2001, SCVWD leased 1,500 kW diesel generators for the:
  - Rinconada Water Treatment Plant: Leased generator was purchased and installed permanently.
  - Almaden headquarters: Leased generator was returned with connection network left in place for use with new natural gas unit with heat recovery system.
  - Vasona pump station: Leased generator has been returned with connection network left in place for use with other leased units as they become necessary.

Programs: Efficiency

✓ **Generators**: Replaced an old, faulty 500-kW diesel generator and associated circuitry to ensure operation of SCVWD e-mail and critical phone systems. Installed 20 kW permanent generators at critical SCVWD water turnouts where remote critical valves and pumps may require operation in an emergency to provide water to retail water companies serving businesses and homes throughout Santa Clara County.

✓ **Other District Equipment**:

- Replaced and installed additional new batteries throughout the district at UPS's (Uninterruptible AC electric Power System, which converts battery power to AC power without interruption when utility AC power is lost), SCADA communications and other low voltage critical use sites.
- Replaced the 20-year-old electrical service at the Rinconada Water Treatment Plant.
- Upgraded circuitry on an emergency generator at Santa Teresa Water Treatment Plant.

Programs: Public Outreach

✓ **Media campaign**: SCVWD and the City of San Jose realized that water conservation and energy conservation are intertwined. SCVWD developed a campaign with the key message: "Pumping water is the single most significant use of power in California."

The conservation message was conveyed through a series of vignettes presented on television, radio, transit, mailers, the Web and in print ads in three languages. The vignettes encouraged residents to check their faucets, toilets and watering systems for leaks. The City of San Jose added its own vignettes to the campaign to discuss the impact of wastewater in the South Bay salt marshes and encourage water conservation to reduce the amount of wastewater released into San Francisco Bay. The vignettes were lighthearted and used humor to convey the messages. Flyers and mailers provided information such as conserve water especially during peak hours; check faucets and hoses for leaks; and fix leaking toilets.

✓ **Alert system**: SCVWD staff developed an energy alert pager system that warned internal power users and retailers of pending electrical problems. Staff also participated as a power expert speaker in numerous conferences and seminars throughout the state.

Programs: Incentives

✓ **Clothes washer rebates**: Promoted its Commercial High-Efficiency Clothes Washer Rebate Program, which encourages businesses, through rebates, to purchase high-efficiency clothes washers.

Budget and Finance

The SCVWD board of directors approved recommendations from staff on projects and financing.

The natural gas generator program cost $2 million, with a budget of $2 million. Financing came from district funds; the California Energy Commission (CEC) sponsored approximately 10 percent of the project.

The solar projects will cost approximately $10 million. The budget is $10 million. Approximately half of the solar projects are being financed by the California Public Utilities Commission (CPUC), with the rest coming from district funds and low-interest rate financing or bonds.

The diesel generator program cost $2 million, with a budget of $2 million. Financing came from district funds.

Results

SCVWD's energy conservation, alternative energy source and contingency programs were a success. The district did not lose a minute of critical operations time during or after the 2001 energy crisis.

SCVWD conducted a telephone poll of 500 residents of Santa Clara County in March 2002. When asked if they recalled the "Tales From the Grid" campaign, 17 percent said yes. When asked if they recalled SVCWD's key message, 26 percent said yes.

The natural gas generator program will enable the district to firm up short-term temporary reliability enhancements and provide prudent management of district's electrical power resources to assure a reliable, environmentally sensitive and economically sound source of uninterrupted electricity. Implementation time was expected to be one to two years. Power usage change was minimal. Expected payback time for the natural gas generators was approximately seven years. Energy-savings estimates were not available.

The solar projects are expected to provide needed power in an economic, environmentally sensitive and reliable fashion and ensure the operation of systems and equipment critical to the SCVWD mission through distributed generation. Implementation time was expected to be one to three years. Power usage change will be minimal. Financing will come from the district funds and possibly low interest rate financing or bonds. Expected payback time for the solar projects is approximately 10 years. Savings were estimated to be one-third to one-half the cost of PG&E power.

The diesel generators ensured the operation of systems and equipment critical to the SCVWD mission even during rolling blackouts. Implementation time was two and a half months after Board approval. The project resulted in lowered usage rates of HVAC and lighting and reduced pumping and high power use operation during peak power periods and stage alerts. Cost and energy-savings estimates were not available.

Between the winter and fall of 2001, 544 rebates for washers in apartment laundry facilities and 104 for laundromats were issued, for a total of 648 rebates. The natural gas savings for these 648 washers was estimated at 5.7 to 9.4 thousand therms per year and the electric savings was estimated at 51 to 100 thousand kWh per year. The washers save approximately 13.5 million gallons of water each year.