Local Government Case Study:

City and County of San Francisco

Background

- Location: San Francisco
- Population: 776,773 (Census 2000)
- Size: 27,000 employees
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Summary

San Francisco has extensive energy conservation and efficiency programs for city-owned facilities and for residents and businesses. In response to the 2001 energy crisis, Mayor Willie Brown in April created the Mayor's Energy Conservation Account (MECA), which provided $15 million for conservation-oriented capital projects throughout city-owned facilities. The funding has helped the San Francisco Public Utilities Commission (SFPUC) implement 13 efficiency projects that were estimated to conserve 60 million kWh annually and as much as $5 million a year in avoided energy costs.

Referenced in Local Government Guides:

- #1, "Reduce Energy Use in Local Government Facilities Through Conservation Measures"
- #2, "Reduce Energy Use in Local Government Facilities Through Efficiency Improvements"

Plan

The San Francisco Public Utilities Commission (SFPUC) assumed that city departments would work with SFPUC on efficiency measures if there was funding and operational support.

SFPUC hired an external consultant to conduct a general audit of selected facilities in the city and County of San Francisco. The consultant collected information about certain energy-using systems in city facilities, including interior and exterior lighting, HVAC, boilers and motors. For the most promising projects, the consultant conducted a more detailed audit. Required data inputs included equipment-use characteristics, energy use and equipment life. The consultant evaluated anticipated costs of projects, the potential energy and cost savings and payback period. The consultant then recommended specific retrofits for buildings with the greatest savings potential. The general audit was completed in one month and the detailed audit, with project designs, was completed in six to seven months.

The consultant's goals were to find projects with a quick payback period, typically less than seven years. Simple payback periods of electricity projects (saving $0.7 / kWh) range from one to seven years. SFPUC found that a large-scale efficiency projects, such as a lighting or heating, ventilating and air-conditioning (HVAC) retrofit, typically required a year for auditing, planning and designing. An additional six to 18 months was required for installation and construction.

Request for proposals were sent to outside contractors and a contract was awarded to the most qualified bidder. The contract process took four months. Overall planning, design and agreement process took at least one year.

SFPUC formed an energy-efficiency division whose responsibilities included: prioritizing projects based on audit results; recommending projects to city department heads; working with departments and engineering consultants to initiate projects; researching future secure energy sources; and overseeing the distribution of the Mayor's Energy Conservation Account (MECA) of $15 million. The division was also responsible for educating city departments about conservation, and was working with the Department of Environment to create a City Energy Plan. The Plan will provide a coherent framework for assessing San Francisco's opportunities to overcome its electric infrastructure vulnerabilities and assure reliable, affordable and sustainable sources of electricity for current and future generations. The division presented the draft plan at citywide, public meetings.

The expected savings for the entire conservation plan was 60,000,000 kWh/year and 2,500,000 therms/year.

Programs: Conservation

✓ **Companywide standards**: The Energy Efficiency Section of Hetch Water and Power prepared a handout of

energy-efficient standards for city facilities – lighting, heating and cooling systems and office equipment – during normal operational conditions. The goal was to reduce energy use by 20 percent or more.

✓ **Conservation Monitors**: 60 city departments appointed Conservation Monitors, whose job was to educate employees about conservation practices in the office.

✓ **Lighting**: Conservation Monitors used a light meter to identify areas where light levels at night exceeded city guidelines by 20 percent or more. (Light meters were borrowed from Hetch Hetchy). In over-lit areas, auditors either removed some lamps in each fixture or shut off lights (where there were bi-level switches). In areas with task lights, general overhead lighting was not allowed to exceed 30 foot-candles.

✓ **Benchmarking**: Participated in a benchmarking study with 23 water and wastewater utilities nationwide to share strategic insights on the deployment of different processes and practices affecting operations.

Programs: Efficiency

✓ **HVAC**: Retrofitted boiler and HVAC in 19 clinics at Department of Public Health.

✓ **Lighting**:

- Retrofitted13 buildings at San Francisco General Hospital Medical Center with 38,000 energy-efficient fluorescent lamps, 40 LED exit signs and 600 reflectors. The goal was to save 2,800,000 kWh/year.
- Retrofitted 19 clinics at the Department of Public Health.
- Retrofitted eight Department of Parking and Traffic (DPT) parking garages.
- Installed 600 fluorescent fixtures at Department of Public Works (DPW) Bureau of Building Repair on Cezar Chavez. SFPUC provided the DPW with funding, technical expertise and facility audits. In exchange, DPW provided personnel to install the recommended energy-efficient lighting.

✓ **Street lighting**: The DPT replaced incandescent traffic lights at 1,100 intersections with LED lamps. The goal was to save 10 million kWh/year, an 82 percent energy reduction.

✓ **Water systems**: City Distribution Division, Lake Merced Pumping Station, installed several energy-efficient pumps to save 1.4 million kWh/year.

✓ **Water supply and treatment**: Installed variable frequency drive motors at Harry Tracy treatment plant to save 600,000 kWh annually.

Budget and Finance

The city and county departments received funds from the $15 million MECA (July 2001), from maintenance and capital-improvement budgets and from the California Energy Commission's (CEC) grants and 3-percent low-interest loans. The loans would be repaid with the cost savings from energy-efficient equipment and measures.

General Hospital lighting retrofits design and construction budget was $1.2 million. The CEC provided a $1.1 million loan at 3 percent interest and a $155,000 grant. Department of Public Health retrofits construction cost was $1.1 million and the CEC provided a $110,000 grant. DPT lighting construction cost was $600,000. DPW cost of audit, design and construction was $250,000.

LED retrofit project cost was $4 million. The CEC provided a $3 million-$4 million loan at 3-percent interest.

Water system audit, design and construction cost was $225,000. VFD construction cost was $75,000.

Results

Conservation measures were no- or low-cost, and helped 71 percent of city and county departments use less electricity in 2001 when compared with 1999. City Hall facility managers consistently saved 19 percent every month compared with the same month of the previous year, based on analyses of metered data.

The lighting, boilers and HVAC retrofits will save 2.2 million kWh and 50,000 therms/year. DPT energy-efficient lighting retrofits will save 800,000 kWh/year. DPW annual electricity savings was 700,000 kWh. LED greatest savings came from reduced maintenance/labor costs because the LED lights only need changing every 10 years, rather than every one to two years.

Office area standards and conservation monitors resulted in 71 percent of departments using less electricity in 2001 when compared with 1999. City Hall facility managers consistently saved 19 percent every month when compared with the same month of the previous year.