Big lighting upgrade holds many benefits for Alameda County

Long used to represent a bright idea, the light bulb may soon replace the dollar sign as the symbol of cost savings in Alameda County, Calif.

The California Energy Commission recently approved the county's loan request to upgrade lighting systems at 50 county facilities. The $1.7 million retrofit project should save Alameda County $362,860 annually, reduce electricity consumption by 2,879,115 kilowatt-hours per year and prevent the release of approximately 1,670 metric tons of carbon dioxide. As a bonus, workers will benefit from improved lighting and significantly reduced mercury in their facilities, while long-life fixtures and standardized lamps will simplify maintenance and cut down waste.

Clean, efficient, standard

The project focuses primarily on fluorescent lighting, said Energy Program Manager Matt Muniz. High color-rendering index (CRI) T-8 lamps will replace T-12 and older T-8 fluorescent lamps. Efficient T-8 lamps and third-generation electronic ballasts will also replace high-pressure sodium fixtures and high-wattage metal halide lamps.

Other changes include installing LED exit signs in place of incandescent and fluorescent signs and replacing all incandescent bulbs with CFLs. "In all, some 25,000 fixtures are involved," said Muniz. "Because the bidding process takes so much time, we wanted one project to cover as many lighting systems as possible."

The 5,000 degrees-Kelvin lamps allow fixtures with four or three lamps to be de-lamped to two lamps, now the standard lamp throughout county facilities. The high-CRI lamps use fewer watts to light a space and though the lumen output is less, the human eye perceives more light at the desktop. Consistency of the same-color lamps also improves the lighting quality, Muniz explained."

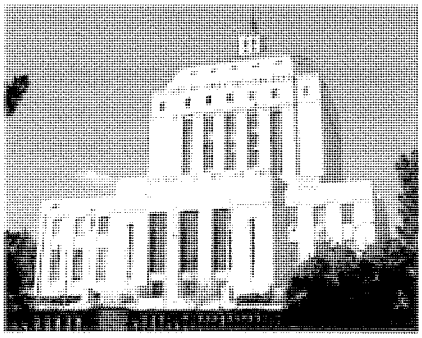
Standardized long-life lamps and ballasts make lighting systems easier to maintain, too, added Muniz. Lamps won't have to be replaced as often, and the equipment will be the same from building to building.

Another reason Alameda County is upgrading lighting, in addition to using less electricity, is that these new fluorescent lamps contain as much as 80 percent less mercury than older models. A few years ago, the county's sustainability program received an Environmental Protection Agency grant to reduce mercury levels in county buildings. Replacing older lamps and removing all mercury vapor lamps will advance that effort.

Payback achieved

The CEC loan will fund 100 percent of the lighting project, with the county expecting to receive $250,000 through utility rebates. CEC's Energy Efficiency Financing program offers state schools, hospitals and local governments loans up to $3 million, with rates as low as 3.95 percent, for energy saving projects.

After rebates, the loan has a payback of four years, fitting within the terms requiring projects to have a five-year payback. Determining that the lighting project would meet the payback period was a lengthy process, ironically, because of past efficiency upgrades. "Back in the early 1990s, the county retrofitted most of its lighting systems with first-generation



The Alameda County Courthouse is one of 50 county facilities receiving a lighting upgrade. The project is expected to save the county hundreds of thousands of dollars annually in electricity consumption. (Photo courtesy of Alameda County)

T-8 technology," recalled Muniz. "We had to do energy audits on all of our buildings to make sure there would be enough savings to qualify."

Energy Watch, a partnership between local governments and Pacific Gas and Electric, performed the audits over a one-year period. The third-party program works with cities, counties and other California agencies to lower energy bills. PG&E provides service to all the county buildings included in the project scope. The only county facility that receives electricity from Western customer Alameda Power and Telecom was not part of the project. "The electricity rates are still too low to get a good payback," observed Muniz.

The audit indicated a broad range of paybacks for the proposed efficiency measures, from a few months to several years. "If a building has already been de-lamped, or we are only replacing two T-8 lamps with more efficient ones, the savings may only be 13 watts per fixture," explained Muniz. "Where we can

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replace four lamps with two and a white reflector or three lamps with two and no reflector, we get the much greater savings."

By aggregating 50 facilities into one project, Alameda County was able to reach an average payback period that qualified for the CEC loan. The approach also fit in with the goal of simplifying the bidding process.

Popular cost-cutting

Lighting retrofits are often referred to as the "low-hanging fruit" of energy-efficiency projects. Upgrading lighting systems can yield savings as high as 40 percent of current costs, and projects fit easily into routine building maintenance, which explains why municipalities are embracing efficient lighting technology.

Contra Costa County used a $180,000 CEC loan to retrofit eight county buildings last year to save about 297,092 kWh, or $41,593 in avoided energy costs, annually. A $900,000 CEC loan paid for new LED street and traffic lights for the city of Alhambra, last summer. The project is expected to save the city around $90,000 annually.

Of course, grants, low-interest loans and rebates make any energy-efficiency project more attractive. Check with your power provider, state energy office or the Database for State Renewables and Efficiency to see what is available in your area.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2008/apr/apr082.htm

Wray wind project

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Even going through a specialized vendor, however, the 900-kW turbine the district settled on cost more than planned. "We were a little short on money, and then a large individual donor withdrew his pledge," Howard recalled.

Green tag sale

Faced with a choice of looking for more funding or dropping the project, Howard persevered. In doing so, Wray School District ran up against a number of issues. "As a non-taxed entity, we don't qualify for the production tax credit that might have made up the shortfall," he said. An attempt to form a separate corporation would have jeopardized the district's tax status, and there was even a question about whether a school district had the rights to green tag proceeds.

Renewable energy credits turned out to be the key to reviving the project. Through many more phone calls, Howard learned of NativeEnergy, a green tag and carbon offset marketer. The company helps to build new renewable energy projects by buying a share of a project's long-term REC output. That support has been instrumental to the success of several tribal projects.

NativeEnergy's purchase, combined with money from a successful bond project the city implemented in 2005, put the Wray School wind turbine back on track. "Once I had NativeEnergy's contract in hand, I called AWE and placed the order," said Howard. "It was a great day, seeing that tower going up finally after we thought the project was dead."

Coordination issues

The long wait was not without some fringe benefits, Howard noted. "We renegotiated our power purchase agreement with Y-W Electric and it was a better deal," he said. "Also, the city bought the ground for the site and gave us the land lease."

The site was different from the one the district originally chose, said Holmes. "The city's main distribution line was close to the land we donated, so it was a less expensive option than the site serviced by Y-W's line."

Transmission continues to be an issue in developing northeastern Colorado's wind resources, he added. "People think that it's as simple as putting up a turbine and hooking it up to the grid," Holmes said. "But the school had to figure out how much turbine it could afford versus how the power would get used. Whenever the size of the turbine changed, the whole equation changed."

In the end, all the calculating, fundraising, research and negotiating are worth the educational opportunities and financial rewards the project will provide for Wray students. And because renewable energy is a good investment for communities, the school district's experience can serve as a model for other community wind projects. In fact, Howard's advice to schools and towns interested in developing local wind resources is, "Call me. I'll be happy to answer your questions."

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