

Case Study: Energy Savings Performance Contract

Marine Science Center hooks a winning solution

Faced with rising energy bills, outdated lighting and HVAC equipment, and some potential safety issues in 2003, Hatfield Marine Science Center Facilities Manager Randy Walker was in a predicament.

Taxpayer money was scarce for Oregon's institutions of higher education. (The 250,000-square-foot Hatfield Marine Science Center in Newport is part of Oregon State University.) In addition, the facility's newly appointed director wanted to "grow" the research facility. To Walker, that meant more energy-consuming high-tech equipment, more people and mounting utility costs for the nearly 40-year-old building.



The library at the Hatfield Marine Science Center in Newport has new energy-efficient lighting thanks to an energy savings performance contract.



Randy Walker, left, facility manager for the Hatfield Marine Science Center, and Cam Hamilton, representative for McKinstry, the energy savings performance contractor, see the ESPC contract as a win-win for all stakeholders.

But today, Walker is a happy man. The facility has new lighting, more efficient HVAC controls, and safer heating and cooling equipment. Employees are comfortable. His staff of seven aren't spending the majority of their time answering complaint calls or replacing burned out bulbs as they had been. The projects are being paid for out of the energy savings. Best of all - the energy savings are guaranteed by the contractor through a program known as an Energy Saving Performance Contract (ESPC).

"What made me push so hard for this was that I was looking at decreasing dollars and what I could do," Walker said. "Without the ESPC, we could not have done this."

Energy Saving Performance Contracts have been used since the 1970s. An ESPC is an agreement between an energy services contractor and a

November 2004



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building owner. The contractor conducts an energy study to identify potential energy efficiency measures, identifies cost-effective projects, designs the projects, hires subcontractors and manages the project installation and completes start up and commissioning of the projects. The owner uses the energy cost savings to reimburse the contractor and to pay off the loan that financed the energy conservation projects.

What distinguishes an ESPC from other types of contracts, however, is that it is a performance contract. The contractor guarantees that the measures will perform as designed and save energy (and costs.) If not, the contractor makes up the difference.

A first for higher ed

The Hatfield Marine Science Center ESPC was a first for Oregon's institutions of higher education. It was also the first Oregon ESPC for the contractor, McKinstry, a well-established Northwest firm.



The labs at the Hatfield Marine Science Center have updated lighting, new controls and safer heating equipment.

“We are now very comfortable with this concept,” said McKinstry representative Cam Hamilton with the firm's Portland office. “We currently have 12 projects underway in Oregon and Southwest Washington.”

Oregon State Engineering Manager Larrie Easterly and Contract Manager Donna Thwing are also happy with the process. Oregon State has two more building projects underway using the ESPC process.

“Properly applied, this is a great tool for public agencies in general,” said Thwing. Once the state legal staff approved the contract language, the new projects are proceeding on a much faster timeline than the Hatfield Center.

“It (the Hatfield Center) was the guinea pig,” said Easterly, who came to the university 18 months ago from the private sector. “This building was ideal because it had a lot of energy savings potential. It went off without a hitch.”

Utility plays a vital role

Walker, Easterly, Thwing and Hamilton all agree that much of the success of the ESPC was due to the team effort that also included Customer Services Supervisor Stan Bishop and the Central Lincoln People's Utility District, the Center's electric utility. Bishop obtained incentives and worked with Walker and McKinstry to ensure the project would pay for itself.

Another key team player was the Oregon Department of Energy. The Department of Energy assists all state agencies with energy conservation projects, new construction or remodeling. By law, state agencies must be 20 percent more energy efficient than code when undertaking projects. This involves all facilities at Oregon's university campuses including the Hatfield Marine Science Center.

The Department of Energy developed a 213-page ESPC Guide for state agencies. The Guide (which can also be used by private sector businesses) is on the Department's Web site (www.energy.state.or.us/school/perfcontract.htm). It includes contract templates, question and answers, a listing of contractors that qualify as

ESCOs (Energy Service Companies), the step-by-step process, and more information.

“The Department of Energy also helped the Hatfield Center financially with our Business Energy Tax Credit and Energy Loan Programs,” said Betty Merrill, manager of the agency’s public building section. “We helped the Hatfield Center find a for-profit business to partner with so they could transfer the project’s tax credit eligibility in exchange for a cash payment. The Energy Loan offers fixed-rate, low-interest loans and is structured so it is paid for out of the realized energy savings.”

For Randy Walker, the ESPC was, indeed, a prize catch. “It’s been a great success as far as I can see.”

Hatfield Marine Science Center

The Hatfield Marine Science Center is located on Yaquina Bay estuary in Newport. It is Oregon State University’s (OSU’s) coastal research and teaching facility. Nearly 300,000 visitors a year view the public aquarium.

The Center’s main building, a ship-support service facility and a dock for oceanographic research vessels were completed in 1965. The Center added teaching labs, research facilities and on-site housing in the 60s and 70s.

The National Marine Fisheries Service built the Newport Aquaculture Laboratory and the Research Support Facility in 1979 and 1981. In 1990, the Environmental Protection Agency completed a new laboratory and OSU received federal funding to build the research library. OSU owns all facilities.

What was done?

Facilities Manager Walker, Hatfield Marine Science Center management and OSU Engineering Manager Larrie Easterly started the process by approving an energy audit by a Bonneville Power Administration

(BPA) engineer. The Center’s utility, Central Lincoln People’s Utility District, also participated.

Following the audit and review, management made a decision to issue a Request for Proposal (RFP) for a ESPC. Three firms responded to the RFP and McKinstry of Portland was awarded the contract.

Lighting upgrades - The contractor replaced over 1,200 lights - T12 lamps and magnetic ballasts with more energy-efficient T8s with electronic ballasts; incandescent lamps with standard and compact fluorescent lamps (CFLs); and incandescent and CFL exit lights with LED (light emitting diode) exit lights.

Controls - The Center did not have a campus-wide energy management system (EMS). Wall-mounted set-point thermostats controlled the HVAC equipment room-by-room. Manual on/off switches controlled the lights and ventilation equipment and they were



Key players in the success of the ESPC for Oregon State University’s Hatfield Marine Science Center include from left (standing) Randy Walker, Hatfield Marine Science Center; Cam Hamilton, McKinstry; (sitting) Larrie Easterly, OSU; Donna Thwing, OSU; and Betty Merrill, Oregon Department of Energy. Missing is Stan Bishop, Central Lincoln People’s Utility District.

frequently left on when the rooms were unoccupied. A control system with variable speed drive fan did operate the air handler for the Visitor's Center and a portion of the main building. With two different control systems that didn't "talk" to each other, the contractor presented several options. Replace both systems, replace System A with System B or vice versa, or work with the existing systems.

The solution was to upgrade both systems and add an interface EMS so both systems had the same control. In addition, the new EMS is user friendly and incorporates visual displays that make staff training easier. The new campus-wide EMS allows programmed start/stop of air handling units, night setback strategies, implementation of an air economizer, and use of occupancy sensors to control lighting systems. A CO2 sensor in the library adds a demand control ventilation feature.

"This was an excellent solution for the Center," said Merrill from the Department of Energy. "It didn't gut the existing system, but allowed both systems to work as designed and have a common easy-to-use control."

HVAC - The main and educational wings had an existing heating, ventilation, and air conditioning (HVAC) system with air handling units with electric resistant heaters that used 100 percent outside air. Most the rooms had baseboard heaters and roof exhaust fan ducts. The heat resistant heaters were quickly becoming a safety concern for Walker and he was eager to replace them. The solution was to upgrade the electric resistance heating elements in the main and education wings with air-source heat pumps having full economizer control for higher efficiency.

Fume Hood - Existing fume hoods that were required in the research laboratories to eliminate noxious gases also removed substantial conditioned air from the facility. Newer hoods operate at reduced flow levels that meet safety requirements. Air handling units are driven by adjustable speed motor drives so savings from air-flow reductions at the hood are realized at the motor.

Energy Savings

277,871 kilowatt hours of electricity per year

Financial Summary

Total cost of project	\$310,318
Central Lincoln PUD incentive amount	\$ 70,715
Business Energy Tax Credit Pass-through amount	\$ 63,068
Adjusted cost deducting incentives	\$ 176,535
Annual energy savings	\$ 15,657
Payback period	11.3 years

Business Energy Tax Credit

The Business Energy Tax Credit is an incentive for Oregon businesses to invest in energy conservation, recycling, renewable energy resources and less-polluting transportation fuels. The Oregon Department of Energy has managed the program since it began in 1979. Through 2003, more than 7,400 Oregon energy tax credits have been awarded. Altogether, those investments save or generate energy worth about \$215 million a year.

The tax credit is 35 percent of the eligible project costs - the incremental cost of the system or equipment that's beyond standard practice.

In 2001, the Legislature approved the Pass-through Option program. It allows non-profits and public entities with eligible energy projects to use the tax liability of a business so they can participate and benefit from the Business Energy Tax Credit. A business pays the non-profit or public entity a lump-sum cash payment equal to the pass-through rate. For most projects this is 25.5 percent of the eligible project costs. The business recoups its investment by claiming the credit against its own tax liability.

The Hatfield Marine Science Center as part of Oregon State University has no tax liability. It had to find a pass-through partner in order to participate in the Business Tax Credit program. US Bank offered to be the pass-through partner for the Hatfield Center. US Bank paid the Center \$63,068 or 25.5 percent of the eligible project costs up front. In return, US Bank claims the \$86,565 tax credit (35 percent of the eligible costs). The tax credit is taken over a five-year period (10 percent the first two years and then 5 percent for the next three years). It is a dollar-for-dollar credit against Oregon income tax owed.

Utility incentive

The Central Lincoln People's Utility District (PUD) also contributed to the project. Stan Bishop, customer service supervisor, worked with Walker and OSU staff to access rebates from Bonneville Power Administration (BPA). The energy projects qualified for BPA Conservation Augmentation ("ConAug") that allows business and industrial customers to receive rebates on energy saved. A portion of the energy savings at the Hatfield Marine Science Center qualified for a rebate of 18 cents per kilowatt hour saved; another portion qualified for 12 cents per kilowatt hour saved.



The Hatfield Marine Science Center is in Newport near the well-known Yaquina Bay Bridge.

Bishop noted that the rebate was "a pretty good deal" for the Marine Science Center. The total rebate amounted to \$70,715.

Other Oregon PUD or municipal utilities that are BPA customers may have Bonneville Conservation and Renewables Discount (C&RD) Program funds or ConAug funds available, too. Businesses that are customers of Portland General Electric or Pacific Power have access to incentives from the Energy Trust of Oregon.

What is an ESPC?

An energy savings performance contract (ESPC) is an agreement between an energy services company (ESCO) and a building owner. The owner uses the energy cost savings to reimburse the ESCO and to pay off the loan that financed the energy conservation projects. Agreements with ESCOs are typically five to ten-year agreements. The ESCO provides an array of services:

- Conducts a facility energy study
- Identifies cost-effective projects
- Designs all aspects of the chosen projects
- Hires subcontractors
- Manages the project installation
- Manages commissioning of the systems and equipment
- Arranges for or finances the project

ESPCs are guaranteed to perform and save energy by the ESCO. If the guaranteed energy savings are not achieved, the ESCO pays the owner the difference between the actual savings and the guaranteed savings. Therefore, it's in the ESCO's best interest to ensure the project is sound and it achieves the guaranteed energy savings.

Virtually any project that saves energy or produces energy can use an energy savings performance contract. Typical projects have included energy management control systems, HVAC equipment, high efficiency lighting, variable speed drives, insulation, and window replacement.

ESPCs are especially good for owners who don't have project management expertise or simply don't have the time to pursue cost-effective projects. A conventional process to purchase energy-efficiency improvements often requires three separate solicitations and contract awards. First, an agency solicits engineering services for an energy study. After reviewing the completed study, the facility selects the improvements to be implemented and solicits proposals for engineering design services. Once the designer completes a plan and specifications, the agency issues one or more invitations to bid to select contractors who will install the improvements.

An ESPC, on the other hand, has a single request for proposals (RFP) covering all aspects of the project and one set of contract documents with the selected ESCO. The process begins with an evaluation of a facility's potential for energy efficiency improvements by the facility staff. If the potential seems promising, the agency prepares an RFP. This RFP covers all engineering, equipment purchasing, construction, and commissioning needed to complete the project. The agency awards the contract to a single contractor who is accountable for all services and guarantees a level of savings to the facility.

Because an ESCO will guarantee project savings, there is an added incentive to pursue energy projects.

The Oregon Department of Energy can provide help to Oregon businesses, public entities and non-profits develop solicitations, select firms, assess the viability of proposals, and review measurement and verification plans. Contact: the Oregon Department of Energy at 1-800-221-8035 (toll-free) or (503) 378-4040 in Salem or visit our Web site: www.energy.state.or.us/school/perfcontract.htm

Benefits of an Energy Savings Performance Contract (ESPC)

- Allows energy project completion with little/no funding
- Allows energy project completion with little/no experience
- Streamlines the procurement process (only one contractor involved in the project)
- Provides continuity (one contractor is responsible)
- Commissions projects (ensures that systems/equipment operate as owner/designer intended)
- Offers guaranteed savings (shifts the risk from owner to ESCO)